Call-A.P.P.L.E.™

World's Largest Apple User Group Magazine

December 1986 • $3.00 U.S.

'Tis the Season...

INSIDE:

- Apple Writer Solution
- A IIGS Conference
- Publish Usable Code
- UniDisk Tech Note
- Penultimate Quit Call
- AppleWorks Rank Ordering
- Macros & Spreadsheets
- Graphics Toolkit--Pt.9 • A.P.P.L.E. Doctor, Meeting Minutes, Write-A.P.P.L.E., new products, and more.

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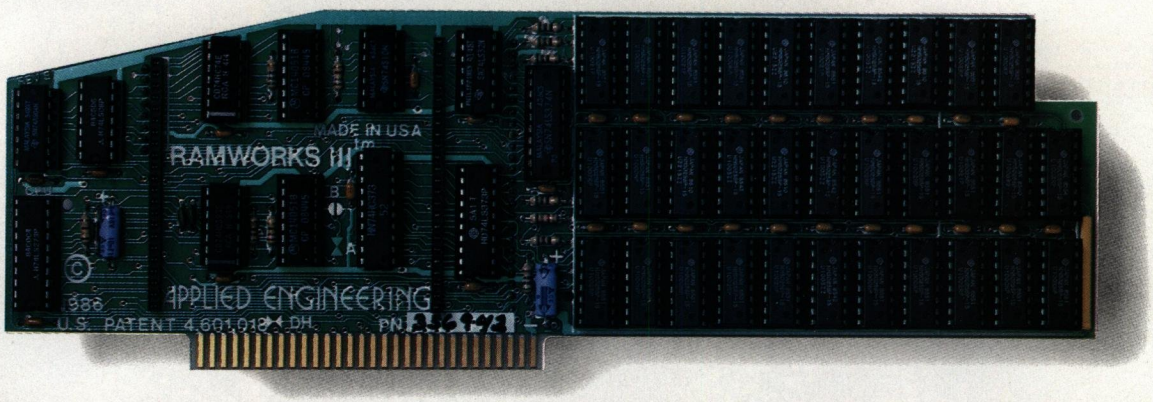
Apple PugetSound Program Library Exchange

RamWorks® III

Patented Performance from the Recognized Leader



With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.

RamWorks III is the newest 3rd generation RAM card for the Apple IIe. It incorporates all of the technology and improvements that years of experience and over a hundred thousand sales have given us. By selling more memory cards than anyone else and listening to our customers, we were able to design a memory card that has the ultimate in performance, quality, compatibility and ease of use. A design so advanced it's patented. We call it RamWorks III, you'll call it awesome!

The AppleWorks Amplifier.

While RamWorks III is recognized by all memory intensive programs, NO other expansion card comes close to offering the multitude of enhancements to AppleWorks that RamWorks III does. Naturally, you'd expect RamWorks III to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K, and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks III does. With a 256K or larger RamWorks III, *all* of AppleWorks (including printer routines) will automatically load itself into RAM dramatically increasing speed by eliminating the time required to access the program disk drive. Switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

Only RamWorks eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 25,000. *Only* RamWorks increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks offers a built-in printer buffer, so you won't have to wait for your printer to stop before returning to AppleWorks. RamWorks even expands the clipboard. And auto segments large files so they can be saved on two or more disks. You can even have Pinpoint or MacroWorks and your favorite spelling checker in RAM for instant response.

RamWorks, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available.

Using RamWorks III couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card. Popular programs like AppleWorks, Pinpoint, Catalyst, MouseDesk, Howard-Soft, FlashCalc, Pro-Filer, Managing Your Money, SuperCalc 3a, and MagiCalc to name a few (and *all* hardware add on's like ProFile and Sider hard disks). RamWorks is even compatible with software written for Apple cards. But unlike other cards, RamWorks plugs into the IIe auxiliary slot providing our super sharp 80 column text (U.S. Patent #4601081) in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

RamWorks III is compatible with all Apple IIe's, enhanced, unenhanced, American or European versions.

Highest Memory Expansion.

Applied Engineering has always offered the largest memory for the IIe and RamWorks III continues that tradition by expanding to 1 full MEG on the main card using standard RAMs, more than most will ever need (1 meg is about 500 pages of text)...but if you do ever need more than 1 MEG, RamWorks III has the widest selection of expander cards available. Additional 512K, 2 MEG, or 16 MEG cards just snap directly onto RamWorks III by plugging into the industry's only low profile (no slot 1 interference) fully decoded memory expansion connector. You can also choose non-volatile, power independent expanders allowing permanent storage for up to 20 years.

It Even Corrects Mistakes.

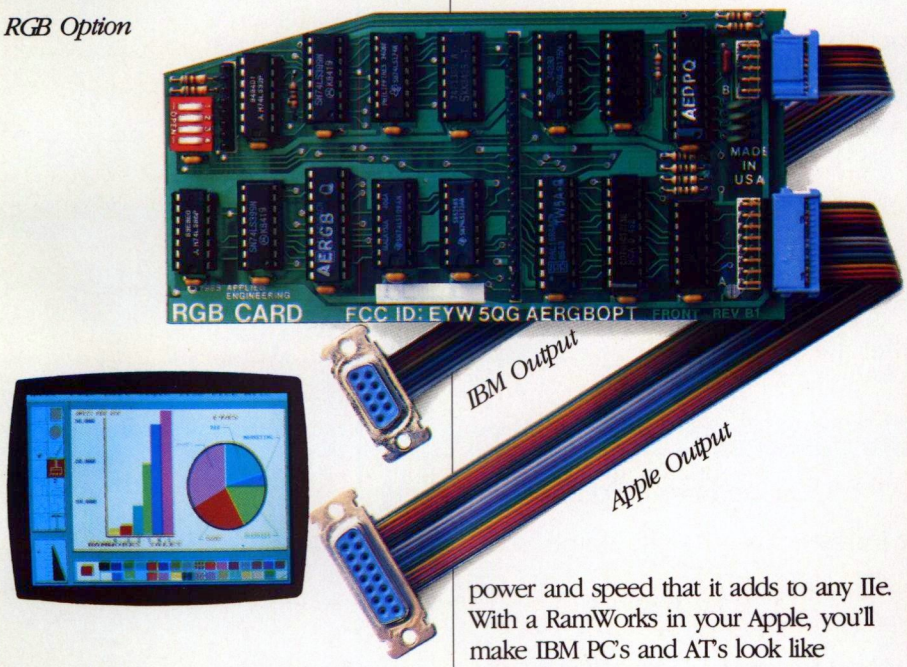
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

RGB color is an option on RamWorks and with good reason. Some others combine RGB color output with their memory cards, but that's unfair for those who don't need RGB *and* for those that do. Because if you don't need RGB

Applied Engineering doesn't make you buy it, but if you want RGB output you're in for a nice surprise because the RamWorks RGB option offers better color graphics plus a more readable 80 column text (that blows away any composite color monitor). For only $129 it can be added to RamWorks giving you a razor sharp, vivid brilliance that most claim is the best they have ever seen. You'll also appreciate the multiple text colors (others only have green) that come standard. But the RamWorks RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software. With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks RGB option provides both Apple standard and IBM standard RGB outputs (cables included). The RGB option plugs into the back of RamWorks with no slot 1 interference and remember you can order the RGB option with your RamWorks or add it on at a later date.

RGB Option

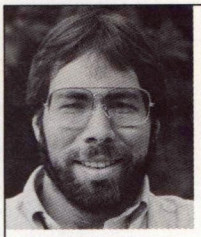


True 65C816 16 Bit Power.

RamWorks III has a built-in 65C816 CPU port for direct connection to our optional 65C816 card. The only one capable of linearly addressing more than 1 meg of memory for power applications like running the Lotus 1-2-3™ compatible program, VIP Professional. Our 65C816 card does not use another slot but replaces the 65C02 yet maintains full 8 bit compatibility.

Endorsed by the Experts.

A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." inCider magazine said "RamWorks is the most powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."



"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."

Steve Wozniak, the creator of Apple Computer

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer power and speed that it adds to any IIe. With a RamWorks in your Apple, you'll make IBM PC's and AT's look like slowpokes.

Quality and Support of the Industry Leader

RamWorks III is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

It's Got It All

- 15 day money back guarantee
- 5 year hassle free warranty
- Built-in super sharp 80 column display, (U.S. Patent #4601081)
- Expandable to 1 MEG on main card
- Expandable to 16 meg with expander cards, with NO slot 1 interference
- Can use 64K or 256K RAMs
- Powerful linear addressing 16 bit coprocessor port
- Automatic AppleWorks expansion up to 3017K desktop
- Accelerates AppleWorks
- Built-in AppleWorks printer buffer
- The only large RAM card that's 100% compatible with all IIe software
- RamDrive™ the ultimate disk emulation software included free
- Memory is easily partitioned allowing many programs in memory at once
- Compatible, RGB option featuring ultra high resolution color graphics and multiple text colors, with cables for both Apple and IBM type monitors
- Built-in self diagnostics software
- Lowest power consumption (U.S. Patent #4601081)
- Takes only one slot (auxiliary) even when fully expanded
- Socketed and user upgradeable
- Software industry standard
- Advanced Computer Aided Design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- Displays date and time on the AppleWorks screen with any PRO-DOS compatible clock
- Much, much more!

RamWorks III with 64K	**$179**
RamWorks III with 256K	**$219**
RamWorks III with 512K	**$269**
RamWorks III with 1 MEG	**$369**
RamWorks III with 1.5 MEG	**$539**
RamWorks III with 2 to 16 MEG	**CALL**
65C816 16 Bit Card	**$159**
RGB Option	**$129**
Optional Software:	
Pinpoint with RAM Enhancement Software	**$79**
VIP Professional	**$219**

RamWorks III. The industry standard for memory expansion of the Apple IIe. ORDER YOUR RamWorks III TODAY. See your dealer or call (214) 241-6060, 9 a.m. to 11 p.m., 7 days, or send check or money order to Applied Engineering.

MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A.

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CIRCLE 2 ON READER SERVICE CARD

Call-A.P.P.L.E.™

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A.P.P.L.E. Co-op NEW PRODUCTS & SPECIALS

PRICES EXPIRE JAN. 15, 1987

MAGNAVOX 8CM515 RGB/COMPOSITE PROFESSIONAL COLOR MONITOR 80

This is an economical, high quality RGB monitor that is IIGS compatible. In side by side tests, this monitor compares extremely well with Apple's new color analog RGB monitor. Features include:

- 14" tube; 17% larger screen than 12" monitors
- TTL RGB (IBM), Analog RGB, Composite Video inputs
- Green display switch for monochrome emulation
- Etched Faceplate reduces screen glare
- Dark Glass CRT improves contrast
- 640 x 240 resolution
- Image size and position controls
- built-in tilt stand
- 2 year parts and labor warranty

Available mid January

Monitor with cable for the IIGS
Price: $299.00 | Code: **HGM3RG** | Wt. 37 LBS.

Monitor with cable for the IBM-PC and compatibles
Price: $299.00 | Code: **HIM3RG** | Wt. 37 LBS.

Cable only for IIGS
Price: $25.00 | Code: **HGXXRC** | Wt. 13 OZ.

Cable only for IBM and compatibles
Price: $25.00 | Code: **HIXXRC** | Wt. 13 OZ

WALT DISNEY GRAPHICS SOFTWARE

Now you can bring the magic of Disney into your home with these two exciting programs from Walt Disney Personal Computer Software & Bantam.

Both programs contain more than 100 graphics and 45 poses of such famous Walt Disney characters as Goofy, Mickey Mouse, Donald Duck, Winnie the Pooh and Minnie Too! Design your own comic strips, greeting cards, invitations, banners, use your imagination! Supports color printing on the ImageWriter II. GREAT FUN for the entire family! Members of our tech support staff were first in line to buy copies for their families!

WALT DISNEY Card & Party Shop

CODE/WEIGHT **S2B4CP (10 oz.)**
A.P.P.L.E. PRICE $22.50

WALT DISNEY Comic Strip Maker

CODE/WEIGHT **S2B4SM (10 oz.)**
A.P.P.L.E. PRICE $22.50

SUPERSONIC™ Multi-channel Digitized stereo Card

Enjoy true stereo sound on your Apple //GS with this new board from MDIdeas. SuperSonic plugs into any slot without disabling the corresponding internal port. It will produce stereo output from any software that addresses stereo through the Ensoniq chip, such as Electronic Arts® Music Construction Set™, GreatWave Software's KidsNotes™, and ABKey™. Features include:

- Creates spectacular sounds and utilizes the new Ensoniq chip of the Apple IIGS.
- High Speed Analog Demultiplexing circuitry separates audio into two separate channels for true stereo sound.
- User selectable power output levels for either speakers or headphones.
- Two .5 watt amplifiers can directly drive 8Ω speakers.
- Line level outputs for connection to external stereo amplifiers.

Price: $49.00 | Code: **HGM5SC** | Wt. 8 OZ.

PINPOINT *FANTASTIC PRICES!*

PINPOINT 2.0
Price: $45.00 | Code: **S2P5P1** | Wt. 1 LB 14 OZ.

PINPOINT SPELLING CHECKER
Price: $35.00 | Code: **S2P5SP** | Wt. 1 LB.

KEY PLAYER
Price: $25.00 | Code: **S2P5KP** | Wt. 1 LB.

TOOLKIT
Price: $25.00 | Code: **S2P5TK** | Wt. 1 LB.

RUN RUN
Price: $25.00 | Code: **S2P5RR** | Wt. 1 LB.

POINT-TO-POINT
Price: $65 | Code: **S2P5PP** | Wt. 1 LB. 6 OZ

INFOMERGE
Price: $40.00 | Code: **S2P5IM** | Wt. 1 LB.

Continued on pg. 7

ORDERING CHECKLIST

To speed all orders, please include:

1. Your Name as it appears in our records (same as on your mailing label).
2. Member number and expiration date.
3. Complete STREET ADDRESS (**not** Box number — see explanation below).
4. Phone number to reach you by day if we have questions.
5. Payment Including:
   Handling charge if applicable
   Domestic or Foreign Shipping Charges
   Magazine Postage if applicable
   (Sorry we do not accept COD or Purchase Orders on individual memberships.)

Each item you order needs:

6. Complete product name (and version if there is more than one product of that type). Specify computer model you are using.
7. Product Code

SHIPPING ADDRESS: We normally ship products by United Parcel Service (UPS). Therefore, the shipping address on your order cannot be a post office box. You may specify a P.O. Box for orders weighing less than 8 ounces. You also may make special arrangements for shipping some items via US Mail, Air Parcel Post, or UPS Second Day Air.

DOMESTIC SHIPPING CHARGES

SHIPPING WEIGHT	COST
Up to 5 Lbs.	$ 2.00
5-10 Lbs.	3.00
10-15 Lbs.	4.00
15-20 Lbs.	5.00
20-25 Lbs.	6.00
25-30 Lbs.	7.00
30-35 Lbs.	8.00
35-40 Lbs.	9.00
40-45 Lbs.	10.00
45-50 Lbs.	11.00

UPS 2ND DAY AIR

WEIGHT NOT TO EXCEED	48 STATES A	HAWAII D
1 lb.	$ 3.00	$ 4.53
2 "	4.00	5.71
3 "	5.00	6.89
4 "	6.00	8.07
5 "	6.50	9.25
6 "	7.50	10.43
7 "	8.50	11.61
8 "	9.50	12.79
9 "	10.50	13.97
10 "	11.50	15.15
11 "	12.50	16.33
12 "	13.50	17.51
13 "	14.50	18.69
14 "	15.50	19.87
15 "	16.50	21.05
16 "	17.50	22.23
17 "	18.50	23.41
18 "	19.50	24.59
19 "	20.00	25.77
20 "	21.00	26.95
21 "	22.00	28.13
22 "	23.00	29.31
23 "	24.00	30.49
24 "	25.00	31.67
25 "	26.00	32.85

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0-4 oz.	$ 1.51	$ 1.96	$ 2.41
4-8 oz.	2.13	3.95	3.95
8-12 oz.	2.75	4.12	5.49
12-16	3.37	5.20	7.03
16-20 oz.	3.99	6.28	8.57
20-24 oz.	4.61	7.36	10.11
24-32 oz.	5.85	9.52	13.19
2-3 lbs.	8.29	13.84	19.39
3-4 lbs.	10.73	18.16	25.59
Each additional ½ lb. over 4 pounds add:	1.22	2.16	3.10

CANADA SHIPPING RATES

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4-8 oz.	1.48
8-12 oz.	2.20
12-16oz.	2.84
2 lb.	3.92
3 lb.	5.00
4 lb.	6.08

For weights over 4lbs: $6.08 + $1.08 additional per pound.

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☐ **Check enclosed** ☐ **VISA** ☐ **MasterCard**

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	CODE	QTY.	PRODUCT	Shipping WT.	Unit Price	Amount
1.						
2.						
3.						
4.						
5.						
6.						

Total Shipping Wt. _____ **Sub Total** _____

*Non-Member add 10% _____

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TOTAL SHIPPING COST _____

$3.00 Handling Charge If Order Is Under $25.00 _____

TOTAL AMOUNT _____

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Renton, WA 98055
(206) 251-5222

PINPOINT PRODUCTS CONTINUED

DOCUMENT CHECKER

Price: $35.00 | Code: **S2P5DC** | Wt. 1 LB.

PROFILER 3.0

Price: $65.00 | Code: **S2P5P3** | Wt. 1 LB.

PROFILER 2.2

Price: $40.00 | Code: **S2P5P2** | Wt. 1 LB.

MATCHPOINT-PC

from Micro Solution, Inc.

MatchPoint-PC provides an easy and effective means of linking IBM PC and compatible computers to Apple DOS 3.3 or ProDOS 8 diskettes. The MatchPoint PC card is a half-size card that mounts in one of the expansion slots and connects to the floppy drives. With the card in place, you simply put the Apple diskette into the PC floppy drive and read the data you want from, or write the data you have created onto the Apple disk for use on an Apple computer. It's that easy! MatchPoint also supports reading/writing CP/M format disks from many computers.

Price: $179.00 | Code: **HIMAMP** | Wt. 15 OZ.

NOTE: We are evaluating the Envoy Card by Asky, Inc. This board is similar to the Matchpoint-PC card, but it plugs into a slot on an Apple II. With one external PC compatible drive, it may draw as much as 800 ma of 5 volts from the Apple depending on the drive used. External power supply/cases are available separately for the drives, thus reducing the Apple load to about 350 ma. Software is not yet PC DOS 3.2 compatible. Special formatting may be used so card/drives can work under ProDOS. Stand by for further developments!

MINDMIRROR

from Electronic Arts

An innovative, dynamic game bringing a whole new concept to "personality" software. Written by Dr. Timothy Leary, famous Harvard psychologist, author and lecturer; Mind Mirror combines the science of Leary's psychometric studies with his own inimitable wit and charm. Part tool, part game and part philosopher on disk. A provocative game perfect for parties or social gatherings like the popular board games "Scruples"™ or "Trivial Pursuit"™

CODE/WEIGHT **S2E1MD (6 OZ.) II+,IIe,IIc**
A.P.P.L.E. PRICE $21.49

ROBOT RASCALS

from Electronic Arts

First you deal the cards. Choose your robot, then send it on a competitive scavenger hunt through a dangerous computer playfield. The item cards tell you what to hunt for. Simple? Well, it would be- if the luck cards didn't keep wrecking your hand... And if the other robots didn't steal from you.

CODE/WEIGHT **S2E1RR (12 OZ.) II+,IIe,IIc**
A.P.P.L.E. PRICE $27.49

SPECIALS AND CLOSEOUTS

CERMETEK APPLEMATE 1200 MODEM with MODEM MAGICIAN *SPECIAL PACKAGE PRICE*

The Cermetek Apple-Mate 1200 Modem card plugs into a slot in your Apple IIGS, IIe or II+ (except slot 3) and requires no external interfaces or power supply. Features include:

- Built in ROM based terminal emulation software
- Hayes "AT" Command compatible
- 1200/300/110 bps full or half duplex operation
- Bell 212A and 103 compatible
- Apple II family bus compatible
- Auto-dial, Auto-answer
- Built-in speaker

Modem Magician is a comprehensive data communications software system for the Apple II, II+, IIe, IIc and compatibles. Utilities are included to convert Applesoft, Machine Language, and Pascal files for transfer. Features include:

- Ability to enter all 128 ASCII characters from Apple II,II+ keyboards.
- Full support of all lower case adaptors for II and II+.
- Support of 80-column video displays: Videx Videoterm with softswitch, Apple IIe 80-column Text Card, Apple IIc.
- Built-in text , phone number and macro editor.
- Built in filing system allows you to easily save, load,delete, and rename system text files.
- Automatically saves incoming data to disk.
- AUTO-ANSWER mode allows you to leave computer unattended.
- Simultaneous on-line printing when using most printer interface cards.
- XMODEM error-checking protocol for accurate transfer of ProDOS files.

Price: $169.00 | Code: **H2XXCM** | Wt. 3 LBS. 10 OZ.

EPSON AP-80 printer *CLOSEOUT*

We are extending this special announced in last month's magazine. Don't miss this opportunity!

Price: $199.00 | Code: **HEPAP8** | Wt. 20. LBS.

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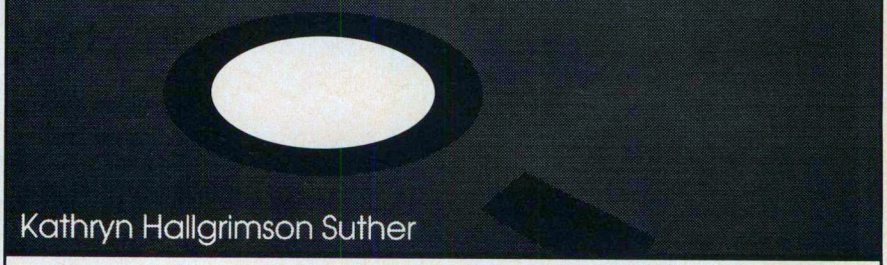

Kathryn Hallgrimson Suther

in the lead:

This is the age of desktop publishing, and the day of the LaserWriter. The uses for computers and LaserWriter printers to produce typeset quality text are infinite. Ad copy, magazines, newsletters, correspondence; the list goes on... Don Lancaster, who has written many books and has been an authority on Apple Writer for years, introduces a solution for not only producing beautiful text, but for creating outstanding page graphics as well.

With a copy of ProDOS Apple Writer II, a IIe or IIc, and a LaserWriter, you can write your own PostScript routines and/or capture Apple hi-res graphics directly into Apple Writer. In **The Apple Writer Solution**, Don supplies us with eight graphic examples and explains such features as: simultaneous use of fonts, easy production of columnar material, multiple graphics on the same page, compressing and stretching fonts, saving symbols to the PostScript dictionary and the possibilities for technical drawings. Whether you're an Apple Writer fan or not, we think you'll find Don's article of interest.

and... close behind:

Our own Keith Nemitz brings home a report on the **Apple IIGS Developer's Conference** held in San Jose on October 23-24. Apple's initial goals in the development stages of the IIGS are outlined, the compatibility question is addressed, and Mr. Sculley outlines Apple's marketing plans for the future.

Bob Bishop starts his new monthly column on assembly language beginning with his article, **Let's Start Publishing Usable Assembly Language Code**. In this article he establishes a set of guidelines for writing and publishing assembly language code, and makes a plea for independent subroutines instead of stand-alone programs.

Ken Kashmarek contributes a **Call -A.P.P.L.E. Tech Note on the UniDisk 3.5**. Rather than a typical light review, Ken supplies us with some interesting recording format information on this Apple product. Although the 5.25" disk has had wide technical coverage, the 3.5" disk has been rather a mystery.

Programs running under ProDOS 8 exit through a standard routine known as "quit". Rick Sutcliffe's **The Penultimate Quit Call** gives readers an alternative to this rather primitive routine. Besides fixing the "intentional" bug, a provision for storing a default application pathname has been made, and more room has been allowed for codes and messages. The complete program and source code is available on one of our PDS disks. (Saves a bit of typing!)

Harold Shuckhart is back with another useful application, **AppleWorks Rank Ordering**. This month we learn how to use the Spreadsheet in AppleWorks to rank order a class of students. It outdates the old histogram method teachers have been using for years.

Jeffrey Jacques starts a two part series on spreadsheets and macros. In **Working with Macros within Spreadsheets--Part 1**, we learn how to ease the pain of entering data into complex templates. His rule of thumb, "If the task is dull and repetitive, it's time to build a macro," is something we should all keep in mind.

In closing, it's time to say good-bye to Randi Rost and the Graphics Toolkit series. This month, in the last installment, we learn how to create a block shape table for moving such things as text around the screen one frame per shape. Thanks Randi for your contributions through the years!

Member Billboard

December 1986

Catalog News

Look for our new catalog containing new products for the Apple, Macintosh, Amiga and IBM computers. We understand that you, our members, may not be interested in all of these products. We have included a questionaire which we would appreciate you taking the time to fill out. We need your valuable feedback on what you want to see in our next catalog. Help us to make plans for the future.

Election Time

Nominations are now open for positions on the board of directors. We encourage our members to get more involved with the Co-op. In the past, our board members have always had a strong background in computers. We would like to attract some new talents, perhaps someone with legal background, or banking and financial strengths. Although there is no monetary compensation, the rewards for working on the board of directors are many.

Nominations shall close at our December 16th meeting. The January 1987 issue will contain the ballot which you need to mail back with your selected candidates. We shall announce the outcome at our February 17th meeting.

Caution

We have a warning we would like to make concerning one of our products. The Maple Technologies disk drives use an optical sensor to detect if a disk is write protected. We strongly recommend that owners of this drive use the write protect tabs that disk manufacturers give in their disk boxes. Any transparent or translucent tab substitutes such as cellophane tape may not trigger the write protect sensor. We are mailing this warning with the product.

Another Local Wins

Congratulations to D.L. Brookman of Federal Way, Washington who won the Reader's Choice drawing at our November 18th meeting. This is only the second time in eight years that a local member has won. He shall receive $100.00 credit in products of his choice from the Co-op.

Happy Holidays

The staff and directors at A.P.P.L.E. Co-op wish all our members, advertisers and business associates a safe and happy holiday season.

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Meeting Minutes

Garry Reinhardt

My hat's off to A.P.P.L.E. Co-op for an excellent special program at the general club meeting held October 21st. The speakers scheduled for the evening's presentation were all directly involved in the development of the Apple IIGS. In attendance were: *Curtis Sasaki*, Project Manager, *Rob Moore*, hardware engineer of the custom chips (FPI fast processor interface), *Harvey Lehtman*, in charge of software development, and *Ray Montagne*, the disk drive and smart port specialist.

The program started out with some demos to show off the IIGS' graphics and sound. The GS was hooked up to a new large screen video display and amplifier. Everyone was impressed with the new capabilities displayed. We were able to pre-view some products such as PaintWorks Plus from Activision, Graphicwriter from DataPak, and even a game from Activision, Tass Times in Tonetown. It was nice to see what improved graphics and sound can add to software products.

We watched a video protraying steps in the development of this new computer. Steve Wozniak voiced his early convictions on the II compatibility issue, the desire for added memory, improved speed, graphics and sound.

Questions began cropping up early in the evening and our hosts were most gracious in supplying information. Since many of these questions were also asked at the IIGS conference, see Keith Nemitz's article *The IIGS Developer's Conference*, for more technical information.

This was definitely a meeting worth attending, the type of meeting we hope to have more of in the future. We'll try to report on significant meetings through this column in Call -A.P.P.L.E.

A.P.P.L.E. CONSULTANTS

Call -A.P.P.L.E. consultants are unpaid volunteers and perform a valuable service. Before placing a call, please make sure you know the time zone you are calling. No calls after 9pm please. Sometimes a consultant will have you leave your name and number and later return your calls. In all fairness, please expect the return call to be collect. We are always looking for more consultants. If you see an area that needs coverage, please drop us a note c/o *Charlie Stillman* with your qualifications and availability. The codes to the right of the phone numbers refer to time zones:

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The Apple Writer Solution

Don Lancaster

Very few people realize that the ProDOS Apple Writer II word processor, running on an Apple IIc or IIe, can give you outstanding page graphics when used to control a LaserWriter. In fact, you can do many things with Apple Writer that are very difficult, if no impossible when attempted by any other program on any other computer. How can this be?

To begin with, Apple Writer is an open and unlocked program on a fully open computer system. This means that you are free to rearrange the scenery to suit yourself, rather than being forced into doing things in ways that others decided was good for you.

Apple Writer has a built-in 9600 baud real time modem that elegantly handles any LaserWriter back channel error messages. Apple Writer also has some very impressive self-prompting glossary capabilities. These glossaries let you use single key entries for most of the needed *PostScript* keywords. When used with a Super Serial Card on an Apple IIe, the needed DC1/DC3 handshaking can be easily activated with a single glossary keystroke.

Apple Writer is the only word processor that I know of that has its own internal supervisory language. This language is called WPL. WPL lets you literally leap tall buildings in a single bound. WPL is ideal for user help screens, for controlling menus, and for automatically setting up and executing elaborate PostScript routines. The text string capabilities of WPL boggle the mind. They far exceed those of most "general use" computer languages.

The Apple Writer/Apple IIe duo nicely bypasses all of hassles involved with AppleTalk. You simply go directly to the LaserWriter's RS-232-C input. You are now free to use your choice of either the Diablo emulation mode favored by beginners and non-technical types, or of unleashing the full power of PostScript from within your own custom routines. Best of all, you are now free to use the LaserWriter in its interactive mode. Rather than working with cruddy approximations of page images, you use the page images themselves.

Capturing Graphics

While graphics are best handled by your own custom PostScript routines, it is a simple matter to capture Apple hi-res graphics or other graphic images directly into Apple Writer. This is possible because PostScript treats graphic bitmaps as hex pairings of ordinary ASCII characters. Once captured, elaborate alterations are easily done, including scaling to any size, anamorphically or otherwise, and easy rotation through any desired angle.

Commercial versions of several Apple Writer/LaserWriter utility packages are already available that will let you unleash the full power of the LaserWriter on your own terms. And they are real products, being shipped now and ready for your immediate use. The utilities include fully automatic form letter generators, envelope addressing, tutorials, isometric drawing routines, bumperstickers, demos, menus,

business cards, elaborate text justifications, page layout formatters, and lots more.

Finally, Apple Writer on an Apple IIe is far more economical than many of the other methods of getting page graphics out of a LaserWriter.

What I'd like to do in this article, is take you on a tour of some of the excellent page graphics you can create by using the Apple Writer solution. By way of comparison, you might like to try doing these images *any other way on any other computer* or on *any other printer*. The chances are overwhelming that you'll be in for some very rude surprises if you try this on your own.

Let's look at eight different images that will give you an idea of the range of Apple Writer solutions to page graphics. We'll begin with four "mostly text" images and then finish with four "mostly graphics" images.

Text Page Images

We'll start out with Figure one, which is a an example of a fully microjustified paragraph of ten simultaneous fonts. As you can see, there is no limit to the point sizes or styles that can be freely intermixed, and such things as subscripts, superscripts, and Greek symbols can be conveniently used. Such subtleties as an automatic initial cap and "hanging" punctuation are also included.

To use a ten font routine, you first preload a short PostScript justification routine into your LaserWriter, and then follow it with your textfile. A few symbols have been previously added to each paragraph of the text file using a WPL search-and-replace routine. The fonts are changed with imbedded escape commands, just as was done with a plain old dot matrix printer. For instance, an *[escape] 0* picks that big first letter. An *[escape] 1* picks the body font, and so on down the list.

Should you need more than ten fonts in your document, all you have to do is redefine them between paragraphs as the need arises. Actually, there is no sane limit to the number of fonts you can use. It just happens that this particular justification routine stopped when it ran out of single digit numerals. Note that very few phototypesetters will let you have this many fonts on line at once, unless they already happen to be speaking PostScript.

Here's a laser printer test paragraph that shows you whole word breaks and full wall-to-wall microjustification of **ten fonts all at one time.** Note the automatic justification cancel on the last line of the paragraph. Professional features include an automatic initial capital, a progressive three stage microjustification, and "hanging" punctuation at the line ends. Both *italics* and ***bold italics*** can be freely intermingled. You can include $^{\text{superscripts}}$ gracefully, and print $_{\text{subscripts}}$ with equal ease. Nothing very fancy is needed for a 51Ω resistor, or when $\pi = 3.14$. While the mixed fonts may be any shape or size, ranging from 3 point thru 20,000 point, most *Special* Effects are best used very sparingly.

Figure One - An Applewriter ten font fill justify.

NUL	$00	0	[@]	Do nothing or null
SOH	$01	1	[A]	Start of heading
STX	$02	2	[B]	Start of text
ETX	$03	3	[C]	End of text
EOT	$04	4	[D]	End of transmission
ENQ	$05	5	[E]	Enquiry
ACK	$06	6	[F]	Acknowledge
BEL	$07	7	[G]	Bell or alarm
BS	$08	8	[H]	Backspace
HT	$09	9	[I]	Horizontal tab
LF	$0A	10	[J]	Line feed
VT	$0B	11	[K]	Vertical tab
FF	$0C	12	[L]	Formfeed
CR	$0D	13	[M]	Carriage return
SO	$0E	14	[N]	Shift out
SI	$0F	15	[O]	Shift in
DLE	$10	16	[P]	Data link escape
DC1	$11	17	[Q]	Device control #1
DC2	$12	18	[R]	Device control #2
DC3	$13	19	[S]	Device control #3
DC4	$14	20	[T]	Device control #4
NAK	$15	21	[U]	Negative acknowledge
SYN	$16	22	[V]	Synchronous idle
ETB	$17	23	[W]	End block transmit

Figure Two - Applewriter Text Columns are easy to do.

Creating Tables with Columns

One of the hardest and most time consuming tasks with text images involves creating an attractive table of columns. As anyone who has set type knows, columnar tables done the "old way" are very expensive and extremely slow. But, as Figure two shows, columnar text using the Apple Writer solution turns out to be a trivial task.

Why so simple? Well, remember that the LaserWriter works with a full bitmap of a full page image. This means that the LaserWriter couldn't care less what order you put the bits into the bitmap. So, if you want something in columns, you work directly in columns *up and down the page*, rather than back and forth.

You simply treat each column as if it was a seperate paragraph using only a few characters per line. Right off the top, this eases the job, since similar entries will usually appear in columns, while wildly different text styles will appear in rows.

Now for the tricky part. You individually justify each column in the way that best shows the image you are after. The first and fifth columns are thus left justified. The third column is right justified.

The second and fourth columns are where the sneaky stuff comes in. Note that we are using fully justified text, yet both columns have constant widths and are aligned both flush left and flush right! How is this done?

Things are not quite what they seem. What you do for column two is create a string of the dollar sign, a space, the first hex digit, another space, and finally the second hex digit. Then you use a fill justify that is so tight that almost all of each space gets used up. The net result is proportional characters that are *inside* the flush left and right margins. Neat, Huh?

In the case of the fourth column, you start with an opening bracket, a space, the letter, a second space, and then

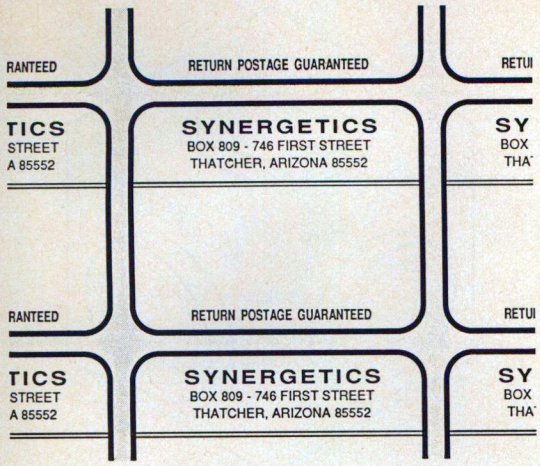


Figure Three - Applewriter Step-and-Repeat Labels.

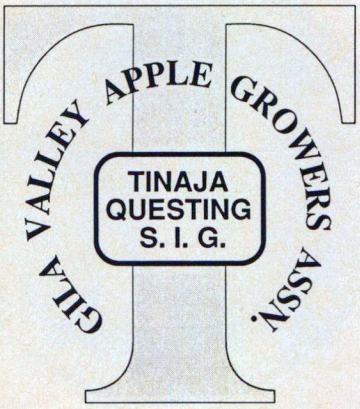


Figure Four - Some Applewriter Specialty Text Fonts.

the closing bracket at the end. Once again you fill justify so tight that almost all of the spaces get squashed taking up exactly what is needed to let you put a proportional character between fixed brackets.

Form letters are another example where the Apple Writer solution really shines. To maximize the speed of automatic form letter management, you use menus under WPL to manage the letter and the list. Then you put the letter into your LaserWriter *only once* and keep it there. For each successive name on the list, you erase only the name from the letter that is already LaserWriter resident. This is much faster than resending the same letter over and over again. To further speed things up, you can even activate the little known *prefeed* feature.

We'll skip a form letter example here since it might come off a tad on the "advertorial" side. But, I'll be most happy to send you one if you call or write.

Multiple Fonts and Images

The need for multiple graphic images on the same page often crops up for such things as business cards, bumperstickers, shipping labels, diskette labels, merchandise tags, and similar items. Figure three shows us how the Apple Writer solution lets you do a step and repeat process that will give you as many images as will fit the printed page at one time.

All you do is define the image once, and the automatic step and repeat routines then duplicate as many images as you need. You can even sequentially number each individual image. You can also put several different, but related images (vol. ONE, vol. TWO, etc ...), present on the final printed sheet.

Figure three also shows us how you can change the vibes of a font by using the *makefont* operator. All three fonts shown on the label are derived from *Helvetica*. The address uses the stock equal font height and width. The company name is stretched so that horizontal point size is larger than the vertical point size. Extra kerning is added between each letter of the company name to further expand the name.

PostScript's *makefont* and *ashow* operators will handle this for you automatically. The return message goes to the other extreme and gives you very compressed characters whose vertical point size is much more than the horizontal.

In fact, there are all sorts of games you can play with derivative fonts, providing literally *billions* of font styles resident in your LaserWriter at any one time. For instance, if you stretch *Helvetica* enough it will turn into a totally different font that resembles a *Steelplate* or a *Copperplate* font. If you print a *Helvetica-Bold* image twice while offsetting and compressing it slightly, you get an extra bold effect. This is particularly effective in oblique. You can also "feed back" horizontal to vertical or vice versa to slant a font as much as you like. You can print an outline font offset on top of a solid font, picking up shadow or 3-D effects with ease.

Grays? Certainly.

The important point of all this font changing is that the Apple Writer solution not only lets you create all sorts of unique and different type styles, but it actually encourages you to do so through its fast and friendly interaction.

How about some "just for fun" typography? Figure four shows the shoulder patch logo used by a special interest group in our local Apple user club. The Apple Writer solution lets you set type around a circle, or, for that matter, along any arbitrary path. Notice the "T" in the background as well. Not only are fonts available in quarter point increments, but there is no sane upper limit to LaserWriter font sizes. I have already used the Apple Writer solution for creating typography that was eighteen feet high!

And, yes, the sharpness *increases* with increasing font size without a trace of chunkiness anywhere to be seen. Such large fonts are ideal for such things as bumperstickers, banners, floats, signs, or even to paint a water tower or an airport hangar roof. Special PostScript routines are available that automatically chop up a large message into as many 8-1/2 x 11 pieces as is needed to complete the entire image. You can create your own custom fonts if you like. Details appear in the *PostScript Reference Manual* and in the *Post-*

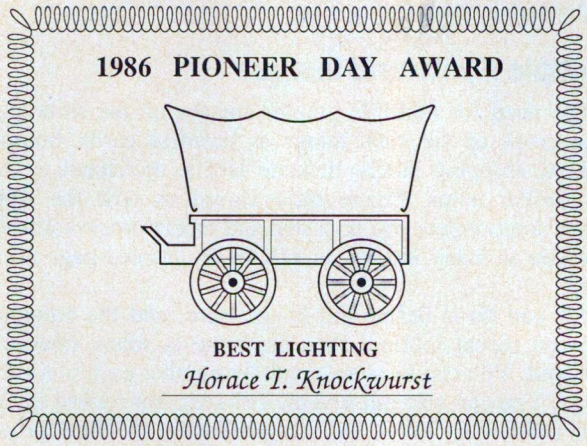


Figure Five - An Applewriter Award Certificate.

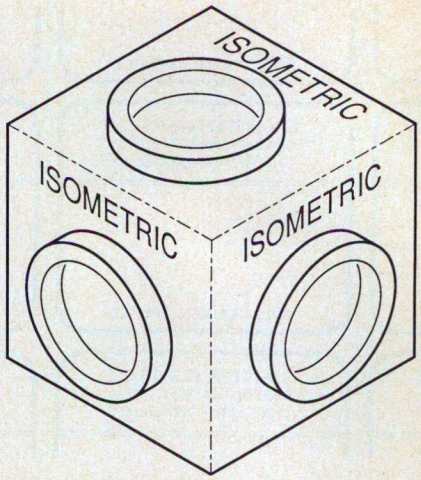


Figure Seven - An Applewriter technical illustration.

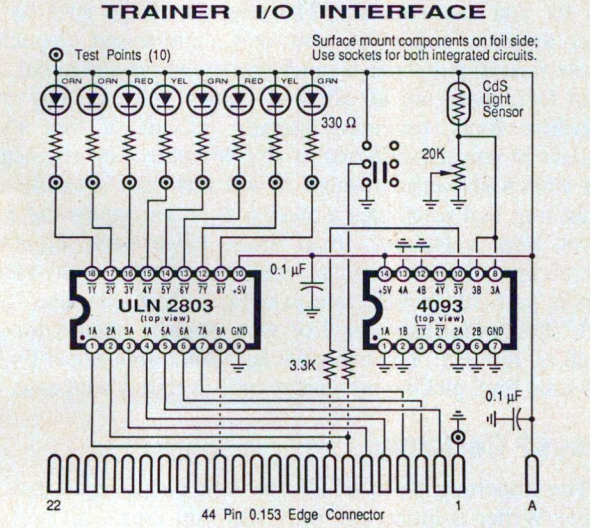


Figure Six - An Applewriter Pictorial Schematic.

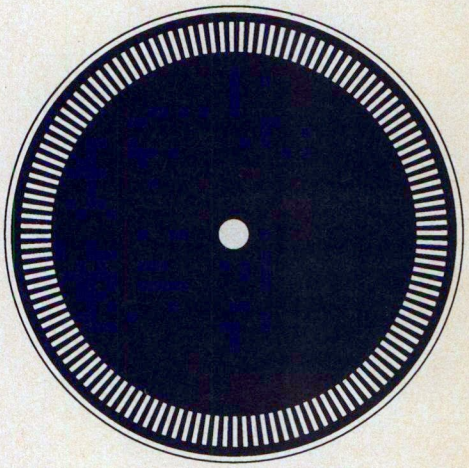


Figure Eight - Applewriter Shaft Encoder Artwork.

Script Tutorial and Cookbook, both published by *Addison-Weseley*.

Graphics Page Images

Let's turn now to images that are more graphics than text. Of course, the beauty of the Apple Writer solution is that you can put as much high resolution typography into your graphics as you like. You can also put as much in the way of fancy graphics into your text images as you like. Actually, to the LaserWriter, there is *no difference whatsoever* between text and graphics. The only difference is in the eye of the beholder.

Figure five is one of my favorite graphic images. This one is a certificate printed on parchment. The fancy border is easily accomplished using WPL out of the Apple Writer solution, and can automatically be expanded or reduced to any size with any number of loops.

The entire image is done totally within Apple Writer, without any need for external graphics. Those loops in the border and the sweeping curves of the wagon cover are done with a magic feature of PostScript called *cubic splines*. Cubic splines also explain how LaserWriter can do very large fonts while still storing them in very compact forms. With cubic splines, you can also do curve tracing, cartoon characters, electronic wiring, and even signatures. Five different splines are used repeatedly for the border, while eleven are used for the wagon.

Turning to fine points, note the extra thin boxwork on the

wagon itself and the glitch free, fine gray spokes at odd angles. Note also how the W in AWARD is kerned for the best possible visual balance. (A copy of this figure on actual calligraphic parchment is included in my free demo package.)

With the Apple Writer solution, any fancy border you can dream up is possible. Most importantly, all of the corners and edges of the border are perfect every time, a trick that gets very painful when using the more traditional border tapes.

The calligraphy is done using a resident font in the *LaserWriter Plus*. It is even possible to do the calligraphy in "real time," immediately before each award is presented.

An electronic pictorial appears in Figure six. A WPL routine under Apple Writer lets you easily create individual symbols for any integrated circuit. You can either create symbols when or as needed with a few dozen keystrokes, or you can save often-used symbols to a PostScript dictionary where they can be accessed with a keystroke or two.

This figure does push the limits of LaserWriter's 300 DPI resolution. Any slight rattiness you may see can be cured by producing a larger figure and then reducing the final result. Or you map opt to going to a fancy PostScript 2650 DPI phototypesetter for your final image. The same textfile is used for both images.

Most people will be overjoyed with images that are this good, useful, and this easily accomplished that complaints will be few and far between. Unless you are an artist or a purist, always use the minimum resolution needed to get the job done as quickly and as simply as possible.

Technical Illustrations

Figure seven shows us a technical illustration style that is called *isometric illustration*. Very simple routines are available for use with the Apple Writer solution that make doing your own technical illustrations of this type a snap. Even the lettering is done in the same way. Ellipses, arcs, and the dashes are also included in the isometric utilities.

Thanks to the power of PostScript, harder types of technical drawings can also be accomplished. The many possibilities include perspective and axoniometric illustrations. While these fancier ways of drawing images used to be a bear when constructed in the old manner, a transformation is a transformation to PostScript, no matter how weird or complex.

Our final graphic image shows one of the many things you can do when you start creatively using the Apple Writer solution to put the LaserWriter to use not as a printer of computer text, but as a universal way of putting white and colored areas onto thin substrates.

In this case, a design for a precision optics component called a *shaft encoder* is handled very elegantly at a tiny fraction of the "old way" cost of custom pasteup. Any later changes, of course, are totally and utterly trivial.

So, before jumping in with both feet, using any old computer or any old laser printer, give the LaserWriter and the Apple Writer solution some close thought. Chances are you will find no other way that has anywhere near the power, the flexibility, the graphics quality, and the convenience of this outstanding approach to personal page graphics.

Don Lancaster is a microcomputer pioneer with twenty books and countless articles to his credit. He maintains a no-charge AppleWriter/LaserWriter help line at (602) 428-4073. SYNERGETICS, Box 809, Thatcher, AZ, 85552. For a free demo pack showing what Apple Writer can really do, contact him or circle #25 on reader service card .

APDAad #1

from the
APPLE PROGRAMMER'S AND DEVELOPER'S ASSOCIATION

ABOUT APDA

The Apple Programmer's and Developer's Association is a one-stop source for the Apple programmer, providing easy access to many of the Apple® development tools and technical information from Apple Computer, Inc. Membership is open to anyone who needs advanced tools and information in order to create Apple-compatible products.

Here are some of the products we offer to members:

- Apple II and Macintosh™ development tools, system software, technical notes, and manuals from Apple Computer. (Apple hardware and Apple-labeled software will continue to be available only from your local authorized Apple dealer.)
- Languages and tools from third-party companies.
- Technical books dealing with Apples and general-interest topics.

As an APDA member, you get a quarterly catalog/ newsletter, plus regular updates. We have a toll-free 800 number and on-line ordering for quick service. We accept VISA and MasterCard, or you can subscribe to our "Auto-Order" service and receive a copy of every new Apple product in the categories you're interested in.

APDA is a subsidiary of the A.P.P.L.E. Co-op. We work in full cooperation with Apple Computer to get you the information and other professional services you need.

APDA membership is just ***$20 per year***. To get your membership application just write or give us a call.

APDAads

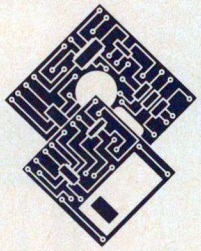
APDA is, above all, an information-deliverer. So, our ads will try to give you as much useful information as possible. They will almost always be in this columnar format, and in most of the Apple-related magazines.

THE APPLE IIGS

Apple has announced the long-awaited Apple IIGS, the 65816 (16-bit) top of the line addition to the Apple II family. Apple and APDA are working hard to help you learn as soon as possible about what development aids there are for the machine. We now list in our catalog one product for the IIGS: the ***Technical Introduction to the Apple IIGS*** an overview of the machine. Here is a list of the other manuals that will be available soon from Apple—most of them through APDA. Watch the APDA files on MAUG and AppleLink, or call for product availability dates for these upcoming products:

Apple IIGS Hardware Reference , Apple IIGS Firmware Reference, Apple IIGS Toolbox Reference, Programmer's Introduction to the Apple IIGS, Apple IIGS Programmer's Workshop (APW), Apple IIGS Programmer's Workshop C (APW C), Apple IIGS Assembler Tool Interfaces, Apple IIGS C Tool Interfaces, Apple IIGS ProDOS 16 Reference.

We are looking for good languages, utilities, and development tools (particularly program shells) that run in native 65816 mode on the IIGS. Our catalog will list these as they become available.



APPLE
PROGRAMMER'S &
DEVELOPER'S
ASSOCIATION

290 SW 43rd St.
Renton, WA 98055
(206)251-6548

Apple II, Apple IIGS, Macintosh and AppleLink ™ Apple Computer, Inc. MAUG ™ CompuServe Information Service, Inc.

CIRCLE 1 ON READER SERVICE CARD

NEW! COMING DEC. 1 THE BEAGLE COMPILER

$74.95 (for any Apple II–64K min.) / by Alan Bird

Machine-Language Speed for Applesoft Programs

Boot THE BEAGLE COMPILER and then run practically any Applesoft BASIC program from disk. The program will be converted on the spot, in seconds, to run at machine language speed.

HOW FAST IS IT?

It depends on your original Applesoft program. 5- to 7-times speed is about average. 10-times speed–and up–is not uncommon.

HOW EASY IS IT TO USE?

Say you've got a normal (slow) Applesoft program on disk named "ABC". Simply type RUN ABC and, within seconds, ABC is running at machine language speed!

It's just that easy.

If you want, make changes to your program (using Applesoft) and immediately re-run it at machine language speed.

"Beginning programmers love it. Experts are amazed."

IT'S QUICK!

Compiling takes only a few seconds (more or less–it depends on a program's size).

EFFECTIVE

Most programs compile without alteration. Syntax errors, illegal GOTO's, and so on, are automatically trapped before a program runs.

COMPACT AND CONVENIENT

A compiled program actually occupies less memory than its Applesoft original. You can even save in compiled format so people can't read or change your original Applesoft code.

PRODOS BASED

Compile Applesoft programs from ProDOS floppy disks, hard disks or Unidisk 3.5's.

Like all Beagle Bros software since 1980, The Beagle Compiler is not copy-protected.

BEAGLE SCREENS

$34.95 (for any Apple IIe, IIc or IIGS) by Fred & Sara Crone, Matt Reimer, Bert Kersey and Rob Renstrom

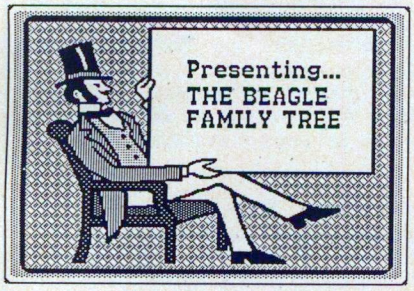
NEW!

Choose from a dozen caption typestyles to give your messages variety. Beagle Screens is compatible with Font Mechanic fonts too.

BEAGLE SCREENS will get your message across–anything from "Happy Birthday" to "Hands Off"– in a unique and colorful way. Use our pictures to add a touch of class to your Apple programs or presentations.

Or just use them to show off your Apple.

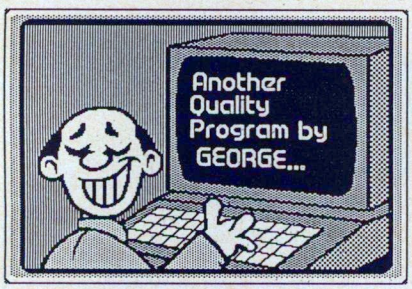
You get forty captionable full-screen pictures on disk (samples shown here). Half of the pictures are automatically animated as soon as you put them on the screen.



Each picture has a blank area (or "balloon") where you can add your own message.

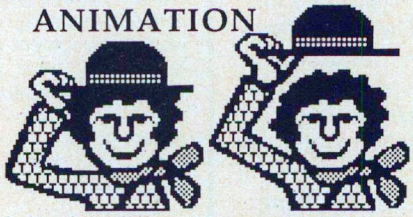
We make it EASY to add your own words and create colorful on-screen "slide shows".

Or print the pictures up as unique signs. (Printing requires a dot matrix printer and any standard printer software like Triple-Dump.)



It's easy–just type the message on the screen, and save the picture on disk.

AUTO-ANIMATION



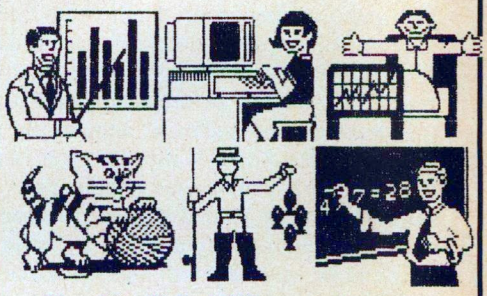
Animation gives your messages extra punch. Twenty Beagle Screen pictures are automatically animated as soon as you load them onto the screen.

MINIPIX DISK #2

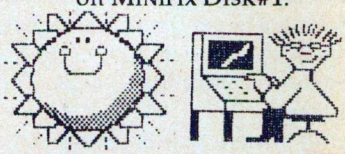
$29.95 / by Fred & Sara Crone

NEW!

MINIPIX DISK#2 is 200 pictures–ALL NEW and ready to use with THE PRINT SHOP™:



Plus–You'll find 200 more pictures on MINIPIX DISK#1:



Coming soon: MINIPIX DISK#3 and Minipix for THE NEWSROOM.™

TRIPLE-DUMP

$39.95 (for any version of Apple II) by Mark Simonsen & Rob Renstrom

TRIPLE-DUMP combines with your dot-matrix (graphics-capable) printer and any Apple II to print:

- Hi-res graphics
- Lo-res graphics
- 40-column text
- Double Hi-res graphics
- Double Lo-res graphics
- 80-column text

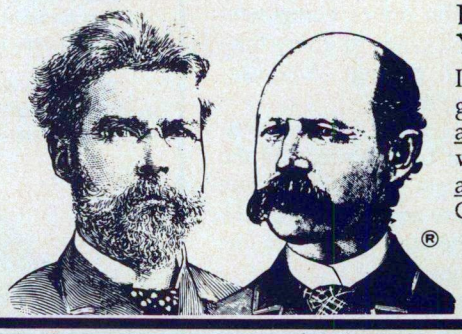
Make "hard copies" of all kinds of images with absolutely no programming knowledge.

Or, if you're a programmer, use Triple-Dump's routines in your Applesoft programs.

Triple-Dump offers picture cropping, rotating and magnifying, plus the ability (on many printers) to adjust the print density.

BANNERS!

Print giant (8"-high letters) text banners on any printer. Great for special occasions!



BUY BEAGLE PRODUCTS AT YOUR SOFTWARE STORE.

If your dealer is out of a particular disk, get on his case. Tell him he can have any of our products in his store for you within a couple of days by contacting any major Apple software distributor. Or by phoning Beagle at **619-296-6400.**

Or you can order by mail (we ship fast!):
Call Toll Free (orders only–
Mon.-Fri., 9am-4pm Pacific time):
1-800-345-1750 (Calif. 1-**800-992-4022**).
Visa, MasterCard or COD(or mail a U.S. check).
Add $2.50 shipping ($5.00 if overseas)
+$3 if COD +6% if California.

Beagle Bros
MICRO SOFTWARE

BEAGLE BROS, INC.
3990 OLD TOWN AVENUE
SAN DIEGO, CA 92110

MACROWORKS

$34.95 (for AppleWorks version 1.3 or older)
by Randy Brandt

Note: New AppleWorks Version 2.0 requires New SUPER MACROWORKS→

MACROWORKS streamlines AppleWorks' word processor with new features. For example, one keystroke now deletes the character or word at the cursor. Another keystroke jumps to the start or end of a line. Another erases an entire line.

Change your mind? Press ⌘-U to "undo" your last delete-command.

New! AppleWorks MOUSE CONTROL

MacroWorks lets you use your Apple's Mouse to control AppleWorks' menus, scrolling, word-block highlighting , and so on.

APPLEWORKS MACROS

MacroWorks will convert any series of keystrokes into a new one-keystroke solid-Apple (⌘) command. (All open-Apple commands stay intact.)

Use MacroWorks' built-in macros or define your own. For example, make ⌘-N type your name and address. Or let ⌘-X save or print all of your desktop files, nonstop.

"...THE BEST SINGLE APPLEWORKS ADD-ON AVAILABLE TODAY."
—A+ Magazine Oct. 86

"...IF YOU USE APPLEWORKS, BUY MACROWORKS."
—Editor's Choice inCider, Aug. 86

You can set up macros that execute any often-repeated function. You can even skip over unwanted AppleWorks questions like "How many copies?".

JUST BOOT APPLEWORKS, AND GO!

MacroWorks is not a time-consuming "pre-boot" disk. To start up, just boot AppleWorks like you always do. Now you've got optional Mouse control and you've got over 4,000 keystrokes-worth of macros at your fingertips.

SUPER MACROWORKS NEW!

$49.95 (requires new AppleWorks version 2.0)
by Randy Brandt

SUPER MACROWORKS provides the same AppleWorks enhancements and improvements as MacroWorks, PLUS:

AUTO STARTUP

Boot AppleWorks and it will get itself up and running without another keypress. It will also automatically load any file that you want.

DIRECTORY DATABASE

Read file names from any or all of your disks into the AppleWorks Data Base.

Now you can sort by file name, type, date, etc., and make printouts, to see what's *really* in that disk library of yours.

NO MORE TYPING PATHNAMES!

When AppleWorks wants a pathname (another disk or direc-tory), you now select from a menu instead of typing. Simply highlight the name you want–it's just like loading files.

TIME/DATE MACRO

One keystroke prints the current date or time anywhere in AppleWorks–in any application.

READ-THE-SCREEN MACROS

Convert from lower case to upper and back! Cut and paste anywhere, including from field-to-field or record-to-record in the Data Base.

LOCAL/GLOBAL MACROS

Define macros that work in one specific application (for example, in the Spreadsheet, but not in the Data Base).

Updates: Mail old MacroWorks manual front cover+$22.50 to Beagle Bros (add 6% if California).

POWER PRINT

$39.95 (for any Apple II–64K min.)
by Rob Renstrom

Works with most full-font downloadable printers, including: Apple DMP and IMAGEWRITER (I & II), EPSON (FX, JX, EX), OKIDATA (92, 93, 192, 193), PANASONIC (1092, 1093), STAR (DELTA, RADIX, SD, SG, SR), and more

POWER PRINT lets you "download" a second typestyle into your printer's memory, so you can alternate between your standard printer-font and a custom font with special characters and symbols:

ABCDabcd6789*&?
ABCDE12345←↑→↓□
OLD ENGLISH
BORDER FONTS TOO!

(Custom fonts appear on your printer, not on the screen. Any key can be made to print any character.)

OUR FONTS OR YOURS

Many custom printer-fonts are included on the Power Print disk. An easy-to-use Font Editor lets you redraw any of the characters in our fonts. Or you can design your own custom fonts and special characters from scratch.

You can even design a set of custom characters that combine to print a small illustration like a signature.

Honestly,
A. Lincoln
Uncle Abe

For a creative touch, print your logo at the top of all of your word processing documents.

FAST–and Compatible with APPLEWORKS

Unlike other printer-font software, Power Print won't slow your printer down one bit. And it's compatible with AppleWorks, and most other Apple software.

SHAPE MECHANIC

$39.95 (for any version of Apple II)
by Bert Kersey & Mark Simonsen

SHAPE MECHANIC converts hi-res drawings into animatable shapes that can be put on the screen with simple Applesoft commands. It also converts sections of hi-res pictures into "drawable" shapes.

Easy "List and Learn demos on the Shape Mechanic disk teach you how to create your own hi-res programs.

HI-RES TYPEFACES TOO

30 proportionally spaced hi-res screen display fonts–both large and small–are included on the Shape Mechanic disk. Each character may be edited or redrawn as you choose.

FONT MECHANIC

$29.95 (for any version of Apple II)
by Mark & Jon Simonsen

FONT MECHANIC gives you thirty new hi-res display typefaces compatible with all of the programs on Shape Mechanic, Apple Mechanic and Beagle Screens.

G.P.L.E.

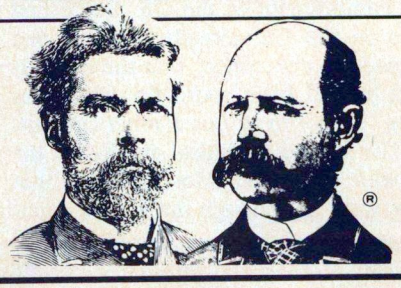
$49.95 (for any version of Apple II)
by Neil Konzen

GPLE is Beagle Bros' "Global Program Line Editor"–still the NUMBER ONE editor for your Applesoft programs.

INSERT AND DELETE characters and words in your basic programs. No more awkward "cursor tracing" to make changes.

SEARCH AND REPLACE: Find every occurrence of any word or variable in a program. Or replace any word with any other.

ESCAPE MACROS: GPLE lets you make Escape-anykey do almost anything you want. For example, Esc-1 can Catalog drive 1. Esc-N can type your name and address, etc.



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1-800-345-1750 (Calif. 1-800-992-4022).
Visa, MasterCard or COD(or mail a U.S. check). Add $2.50 shipping ($5.00 if overseas) +$3 if COD +6% if California.

BEAGLE BROS, INC. 619-296-6400
3990 OLD TOWN AVE., SAN DIEGO, CA 92110

A IIGS Developer's Conference

Dan Hillman and Steve Wozniak laid the foundation. They wanted absolute compatibility.

Keith Nemitz

On September 15 of this year, Apple Computer Inc. unveiled their newest Apple II computer, the GS. One month later, 3rd party developers were invited to a two day conference concerning Apple's marketing plans, a technical overview of the machine, and face to face meetings with the engineers and product planners who spent the last two years developing it. Over 300 people representing 200 companies attended.

The handful of developers at our table during breakfast spoke quietly, and unenthusiastically about Apple's new computer. The overall mood was one of non commitment to the GS. Some had irons in the fire already, but no one seemed too concerned that the marketplace would have room for what was being unspoken as *just* another computer. The known technical merits of the GS were discussed. Most believed that there were not enough innovative capabilities for the announced pricing. The Ensoniq sound chip was about the only cited feature which no competitor's computer could match. Attendees at the conference were largely curious about the computer's design, and they wondered how much their efforts would be supported by Apple.

A Formal Introduction

The day long seminar on Thursday began right on schedule. 8:00 a.m., Guy Kawasiki, head of Apple's Evangelist group (public relations) gave a warm welcome to the large audience. The lights were dimmed, and their wall-sized backdrop display screen lit up with a short feature video showing off the Apple IIGS, singing Apple's new key slogan "The Power to be Your Best". The whole day was scheduled for marketing information and product hype.

Neal Amsden mounted the podium introducing himself as Master of Ceremonies. He then officially reintroduced the Apple IIGS, and began a few demos showing off the computer's graphics and sound. One demo really caught the attention of the audience as evidenced by numerous expressions of amazement. They had digitized a scene from *The Empire Strikes Back*, where the Millineum Falcon is being chased through a meteor swarm by Imperial TIE fighters. Each frame of the animation had been recorded back onto video tape from the GS's composite video port and played back in real time.

The Design and Development

Then another video was shown which featured several managers from the Evangelist and Engineering groups presenting their stories of the design and development stages of the IIGS. Dan Hillman and Steve Wozniak laid the foundation with their goals for the Apple IIGS. They wanted absolute compatiblity with the existing Apple II line, better graphics, sound, more memory, and a house cleaning of the architecture. They wanted faster processing, and they wanted the Macintosh User Interface. Not everything was laid out at the beginning, but time and effort saw this integration of ideals, and the compromises between goals were pared down to a minimum. All their enhancements might lead one to suspect that Apple's two product lines would conflict in the market, but the speakers soon made it quite clear how Apple intended

to make the distinction between the Apple II and the Macintosh.

They insisted that the GS was not a replacement for either the Apple IIe or IIc computers. Those two products would anchor the low end of Apple's market. They will be slated for sales to education institutions, grades 1 though 8. The IIGS is expected to be sold to preliminary grade teachers and administrators. It will be sold to high schools, at all levels. Instructors, lab rooms, administrators, even school publications will be courted with the Apple IIGS. The home computer market is expected to make the majority of its purchases from all three machines, depending upon the income bracket of the individual. At no time did Apple suggest that the IIGS should be used for business applications. The Macintosh is their kingpin for that market.

A Look at Marketing

Apple's sales strategy for the GS was summarized. They plan a three stage promotion. The first stage is completed. Their roll-out of the Apple IIGS with all its hoopla and fanfare was meant to generate initial excitement. Both Apple's own introduction and advertising, as well as local retailer's sometimes bizzare anouncements, were exceptionally effective in getting the message out. Several hundred thousand people saw some sort of ad or attended some event concerned with the new machine on the first day. The initial marketing splash has died down, and we have already entered stage two.

It is believed by Apple that the home computer market is still untapped of its full potential. They feel that consumers are unaware of the new capabilities software innovation has added to personal computers over the last five years. Apple has begun its Apple Open House program to educate the public about the new flexibility in computers. In 20 major cities, Apple will set up a hands on demonstration of their computer line at large shopping malls. In the next two months this experiment is expected to give over 11 million people the chance to use a computer. It was felt that malls are an unobtrusive, relaxed environment where the public will be drawn towards the colorful Apple logo and feel welcome when invited to see the possibilities computers can provide.

The final phase of their IIGS sales plan is product promotions. In order to capture the year-end sales rush, Apple has planned two promotions slated for this year. They are Apple Care Kits and Apple Pays Half.

The Apple Care Kit is a separately purchased extended warranty package that includes rebate coupons for software. The Apple Pays Half promotion is much bolder, but has its limitations. If you walk into an Apple retail store and purchase a bundled Apple computer, (ie. CPU, monitor, and disk drive) and then you make any additional peripheral purchase (printer, expansion cards, modems, etc.), Apple will pay one half of the retail price for you. The catch is you must make the additional purchase during the same visit to the store. If you leave and come back a minute later, the Apple Pays Half promotion is no longer valid.

The period of marketing information was interlaced with showings of Apple's 11 new commercials. They are an imaginative collection and made quite an impression upon the audience. Enjoyable examples include the Apple II ad explaining the technical jargon of school children, and the Macintosh ad showing the changes a Macintosh can make to a company when placed in a business environment.

A Livlier Mood Ascends

So much for the first half of the day's lecture. We stopped for lunch, and it soon became obvious while talking to the developers and over-hearing remarks, that the somber mood during breakfast had broken and the conversation level was more energetic, flowing freely, if still a bit cautious. Apple 3rd party support has seen rough times in the last three years. Many strong players are no longer with us, and few of those in attendance have forgotten that fact.

All the energy drained from us by Apple's hype, returned as food and rest replenished our spirits. We reentered the meeting hall with new vigor, ready for the next round of audio-visual persuasion. They continued the marketing and technical fanfares for the rest of the afternoon, but many informational comments seeped out.

As in the first half of the day, Neal Amsden introduced speaker after speaker, each one presenting their own speciality concerning the IIGS project. The subject of software marketing revealed that computer owners make most of their software purchases within the first year after buying the computer. The amount of software bought in subsequent years declines rapidly. Either the lure of piracy, be it greed or curiosity, enthralls the owner, or people just become satisfied with the uses they put their computer to.

One of the afternoon's videos interviewed the developers of the Apple IIGS while it was still shrouded in mystery. A very interesting, but probably incomplete list of code names for the GS were mentioned. I suspect you may recognize a few. The code names are: Cortland, Cobra, Gumby, Vegas, and Rambo. I thought it was funny that no one called it *Granny Smith*.

The Compatibility Question

On the topic of software compatibility, several reasons were given why some II+, IIe, and IIc software won't run on the GS. It is very important that this information spreads so people will be able to either port existing software, or build new software that will work on all machines.

The age old nemesis of law abiding software purchasers raises its ugly head. There are many copy protection schemes that will be unable to recognize their master disk when run on a GS. In particular, protection schemes that use timing loops, or turn off the interrupt mechanism will probably fail. Also, a few programs rely on the fact that 6502 instructions will wrap around the end of a program bank. With the 65816, this assumption is hazardous.

The most significant cause for software incompatibilities is jumping program execution into illegal entry points of the monitor ROM. One might have thought that by now, after two ROM changes in the Apple II, this uncautious practice would have been cleared up for good. Apple actually added previous illegal entry points to the new list of legal addresses, but they couldn't add many and still rewrite the ROMS.

The last reason for software incompatibility affects communications software. When Apple decided to allow the IIGS to use their AppleTalk network system, they installed a new serial chip that had never been seen before on an Apple II. Communication software on the II was typically forced by hardware and firmware limitations to talk directly with the interface chips of various serial cards. You now have the choice of running existing communications packages by plugging in your old serial card and disabling the standard serial port, or updating to newer versions of your software.

More to Come

Some features of the Apple IIGS mentioned do not exist yet. Apple has spent two years developing this machine, but many ideas have yet to see fruition.

In the works is a new version of ProDOS 16 that will allow guest file systems. (In other words, different disk formats—IBM or Mac—could be recognized and these files thereupon used.) The new ProDOS will also allow installable RAM based I/O drivers. The Apple IIGS ToolKit, which is based on the Macintosh Toolbox, does not currently support resources. Apple does have plans to add this capability to the IIGS's operating system. One very exciting idea is the possibility of booting your Apple IIGS off the AppleTalk network. This will allow a common file server to supply the operating system instead of taking up precious room on a floppy disk. It was mentioned later that the full operating system and ToolKit requires most of the space of an 800K disk! There are many things we can look forward to for the GS.

Nearing the end of that first day, more and more nods of agreement and stronger applause met each revelation at the podium. Apple had made a solid case to developers for supporting their new machine. The mood was just right for John Sculley to summarize the day's lessons and speak about the future at Apple Computer Inc.

One Open-Apple

Mr. Sculley addressed the conference with words of encouragement and reassurance. He wanted to make it clear that Apple was headed in a sound and mature direction, but as a side comment he noted that Apple's flair for humor and fun was important to their company's lifestyle. He thanked the 3rd party developers for putting Apple in the running, and for having come through for Apple in good times and bad. Because of it, Apple is stronger than ever. They have begun new programs in research and development, and will spend over 120 million dollars in their next fiscal year for R&D. He revealed Apple's cash in the bank at 600 million, and pointed out a total absence of debt. The last fiscal year earned them gross revenues of 1.9 billion dollars, and they are shooting to cross the 4 billion mark by 1990, the same year they plan to spend 300 million in R&D. He claimed an installed customer base of 2.7 million Apple II computers, and credited their success to quality control. The innovations they expect for tomorrow's machines will continue to earn this label of quality.

Mr. Sculley discussed product lines and markets. He emphasized the theme of the day, that the IIGS is a computer for education and the home. Business will be run on a Macintosh. He called the GS an upgrade for education, but mentioned that the Macintosh fit into education at the collegiate level. When he began to discuss Apple's pricing policy, quite a few ears perked up. Mr. Sculley explained that Apple computers were price dependent versus value markets, that the perceived value was the key factor to pricing. To me this meant that when people buy a computer, it may not be for cost alone, but that the consumer's perception of value in a computer overrides a pure price comparison. Apple has a perceived strength, and they enhance their image through advertising and more subtly through the user groups and word of mouth. The second strength mentioned, which spread smiles throughout the room, was support. The support of the 3rd party developers to Apple computers is easily visible when you walk into a computer store and you see racks upon racks of software and hardware—all developed and sold outside of Apple. It has been the strong point for Apple since 1977.

Mr. Sculley praised the user groups and spoke of Apple's plans to assist them through their new program called *The Apple User Group Connection.* This link will allow user groups access to up-to-date information from Apple, and will give Apple a chance to get to know their customers. They will gain access to their customer's needs and wants, and be able to have impact on those users who have influence over new purchases. The Apple User Group Connection will also serve 3rd party developers as an outlet for product marketing.

"Apple is not in the business of being just another computer manufacturer, it is in the business of making computers interesting", Mr. Sculley said. Apple does have plans to be "connectable" to other vendor's products (vague reference to some other computer company was given), but Apple will never clone someone else's computer. Apple will put great emphasis on "ease of use" and productivity value. He mentioned a dedication for better graphics, the Apple User Interface, and the power inherent in functionality.

So far corporate America has never seen a productivity increase from personal computers in the workplace, and Mr. Sculley blamed this on a lack of understanding of how computers assist work. He feels that the one on one relationship which current personal computers supply is a hinderance to effective inter-staff and inter-office communications. "We will work better by working differently". Apple is pushing the idea of simulations as a means to communicate processes. He even cited the example of a spreadsheet being a simulation. You can dynamically demonstrate the effects of parameters on a model, and that is a powerful means of communications. Mr. Sculley's references to simulations were intense enough to give the impression that Apple is hard at work developing this technology.

He went on to say that the future of computers are as tools to handle the information explosion. Apple's prime research is currently in communications and systems. There will be an emphasis placed on shared resources. Imagine the Macintosh finder program with icons for distributed systems. If you need a file from another system, whether it be from another node on the network or a mainframe on the other side of the world via modem, you can access it with just a double click of the mouse. We may see a new network system, and we may see CD-ROMs. He declined to elaborate. "Apple refuses to comment about unannounced products.", A phrase widely repeated throughout the conference.

Mr. Sculley ended his speech by saying that last year there had been one Apple, isolate and defensive. This year as Apple strives to again share its resources with the community of developers, it will be "one open Apple". He thanked us all and left.

The developers applauded with enthusiasm. Apple had presented its case, and John Sculley's speech brought the message home. Developers in league with Apple have a bright future ahead of them. As we pressed to exit the ballroom, no one within earshot mentioned so much as a complaint. The developers had seen the GS, they had been shown the plan, and were repeatedly informed that Apple needed them. They believed. Time would be spent answering questions tomorrow. The parallel seminars detailing hardware and software considerations would be well attended.

As for what they thought about the Apple IIGS, I heard one programmer say, "They're going to sell a zillion of them."

Let's Start Publishing Usable Assembly Language Code

Bob Bishop

The purpose of this paper is to suggest a set of guidelines for writing assembly language programs that are to be published in magazines. These guidelines are presented in a form of three simple rules. By following these three rules you can be assured that your assembly language code will be of use to the greatest number of readers. We should also note that these concepts can apply to any program language.

Rule#1:

Publish Subroutines, Not Programs

A number of years ago, I came across a magazine article that showed how to play music through the Apple's built-in speaker. The author of the article published an assembly language program whereby different notes were produced depending upon which keys on the Apple keyboard were pressed. The program worked just fine, except that the only way you could use it was by manually punching keys. Being a programmer, I was naturally interested in trying to extract the music playing subroutines so that I could incorporate them into some of my own programs.

But, the published program did not contain any subroutines. It consisted of one long main program in which both the keyboard sampling and the music generation were simultaneously done in an intertwined rat's nest of code. When I tried to delete the instructions that referenced the keyboard, it caused changes in the timing loops and the music was no longer in tune. I finally gave up on the whole thing and just wrote my own routines.

The author of the music program obviously did not know the proper way to design software. He probably just sat down at his computer one day and started hacking. When he finally got the program to work, he simply published it and never bothered to even clean it up.

A completed program represents a dead-end street. There is nowhere for it to go because it is already finished. There is nothing you can do with a program but run it! A subroutine, on the other hand, represents an incomplete program. It provides a raw capability that is looking for an application. As such, it has infinitely more potential than a finished program.

To draw an analogy, suppose you just won the jackpot on a T.V. give-away show. As your prize, you are offered your choice of either a $10,000 automobile, or $10,000 in cash. Which would you take? Naturally, you would take the money, because if you took the car, all you would have is a car. By taking the money you have the option of going out and buying the same car, or spending the money on anything else you might desire. The money offers you unlimited potential.

Perhaps a better analogy would be to think of subroutines as being the software equivalent of the modular components that make up a hi-fi system. By choosing your own components (speaker, turntable, etc.) you can customize your hi-fi to your exact

tastes. But if you simply buy a completely assembled stereo system, you have no choice but to take what you get.

Now don't get me wrong. I'm not saying that programs should *never* be published. In fact, publishing a small example program is an excellent way to illustrate the use of subroutines. However, published programs should be designed so that other programmers can use its constituent parts. In other words, programmers should design their programs as a collection of subroutines, with each subroutine performing one well-defined task.

Rule #2:
Avoid Confiscating Any Of The Computer's Resources

Of the three rules, Rule #2 is the one that is most often violated. Even if a programmer follows Rule #1 and publishes his code in the form of subroutines, he often misses the boat on Rule #2. Too often, he assumes that his subroutines are going to be the *only* subroutines in the computer! It never occurs to him that the users of his subroutines may also wish to incorporate other subroutines of their own. Therefore, subroutines should be written in such a manner that they avoid "stepping on the toes" of any other subroutines *that might* also be in the machine at the same time. "Stepping on toes" generally occurs as a result of violating Rule #2. This rule can actually be broken down into a set of four subrules.

Rule #2(a):
Maintain the Integrity of the X and Y Registers

If your subroutine needs to use the X and/or Y index registers you cannot just assume that they are available. Those registers may already be in use by the program that is calling your subroutine. Therefore, your subroutine must first save the contents of any index registers before it uses them. Then, before exiting from the subroutine, those registers can be restored to their initial states. (The hardware stack can be used for the temporary storage of these registers.)

Rule #2(b):
Maintain the Integrity of Page Zero

As we know, most of the zero page locations have already been claimed by BASIC, the Monitor ROM, the disk operating system, etc. Therefore, the few remaining unused locations are prime real estate indeed! Again, we cannot simply just help ourselves to whatever zero page locations we want because some other subroutine may already be using them. Therefore, just as with the X and Y index registers, we must be sure to first save the contents of any zero page locations that we wish to use. (Again, the stack is a good place for storing these values.)

Rule #2(c):
Avoid Using Absolute Memory Locations for Passing Subroutine Calling Parameters

Some programmers like to assign subroutine calling parameters to a sequence of fixed memory locations (a common area), such as $0300, $0301, etc. But, just as in the case of the memory locations on page zero, this can lead to one subroutine inadvertedly "stepping on the toes" of another. Therefore, subroutine calling parameters must be passed in such a way that avoids utilizing predefined absolute memory locations.

One solution to this problem is to pass the calling parameters in the 6502's registers (the accumulator and the X and Y index registers). However, this works only if your subroutine has no more than three calling parameters. In addition, this practice violates Rule #2(a). And lastly, it makes the subroutine difficult to call from a BASIC program.

The best way to pass subroutine calling parameters is to assign them to memory locations inside the subroutine module itself, (i.e., to the sequence of memory locations immediately preceding the subroutine's entry point). For example, suppose we have a subroutine named PLOT which has three calling parameters XCOOR, YCOOR, COLOR. The beginning of such a subroutine might look something like this:

```
XCOOR   DS    1
YCOOR   DS    1
COLOR   DS    1
PLOT    TXA
        PHA
        etc.
```

The calling program can then reference the XCOOR parameter as PLOT-3, the YCOOR parameter as PLOT-2, etc. so that no matter where the subroutine finally gets loaded into memory, the calling parameters will always follow along with it.

Another advantage to this method is that the calling parameters can be assigned default values. (When using EDASM simply use a DFB pseudo-op instead of a DS pseudo-op when specifying the parameters.)

Rule #2(d):
Make Your Subroutine Relocatable

Since you are not allowed to confiscate memory locations from page zero, or confiscate memory for passing calling parameters, it should come as no surprise that you are not even allowed to confiscate memory for the subroutine itself! This means you should not design your subroutine so that it must be loaded into a predetermined set of memory locations. Your subroutine must be able to work anywhere in memory. In other words, it must be relocatable.

Most assemblers provide the option of generating relocatable object code. In the case of the EDASM assembler, this is accomplished by simply preceding the source code with a REL pseudo-op. In addition, EDASM also provides the ENTRY and EXTRN pseudo-ops for dealing with global symbols. The ENTRY pseudo-op declares a label to be a global symbol. The EXTRN pseudo-op is used to declare a reference symbol as being global.

Depending on the assembler you use, the concept of the REL, ENTRY, and EXTRN pseudo-ops may be implemented slightly differently. If your assembler requires more than three such pseudo-ops for generating its relocatable code, you might want to consider switching to EDASM. And, if your assembler doesn't even provide for generating relocatable code at all, you should definitely consider switching to EDASM! (The EDASM assembler is available in Apple's ToolKit assembler and also available with its Linking Loader from *Interactive Arts, 2715 Porter Street, Soquel, CA 95073, (408) 475-7047.)*

Rule #3:
Clearly Document Your Subroutine So That Any Idiot Can Use It

I know, we all hate doing paperwork. But unless you document how your subroutine works, nobody's going to be able to use it. Its operation may be crystal clear to you, but the readers who will be using it may not understand it from Shinola.

Just how you choose to document your subroutine is pretty much a matter of personal taste. As a bare minimum,

you should describe:

- what the subroutine does;
- which of the calling parameters are input parameters to the subroutine and the range of values they can assume;
- which parameters are the output parameters from the subroutine and the range of values that can be expected;
- any side effects that the subroutine causes (such as leaving the hi-res graphics screen turned on, returning with the carry bit set if an error occurs, etc.)

And, as mentioned under Rule #1, it is a good idea to include some simple main programs that call your subroutine. This way users can see by example how the subroutine is supposed to be used.

You might argue that any subroutine is "usable", as long as it contains sufficient documentation describing how to use it. For example, suppose a subroutine violates Rule #2(a), by not restoring the index registers after their use. If the documentation points out this fact (that the registers are not saved) then the subroutine should be just as usable as one which does save the registers. The user of such a subroutine simply has to design his calling program so that no conflict of index register usage occurs. While this reasoning might constitute a valid argument, consider the following two hypothetical subroutines RANDOM1 and RANDOM2. The documentation for RANDOM1 might be as follows:

DESCRIPTION OF RANDOM1:
Generates a random number in the range zero through N.

Enter with:
A-Reg: containing the value N.

RETURN with:
A-Reg: containing the random number.
X and Y Reg: intact.

Now, consider the documentation for Subroutine RANDOM2:

DESCRIPTION OF RANDOM2:
Generates a random number in the range zero through N.

Enter with:
A-Reg: containing one more than the 2's complement of N.
X-Reg: must contain $00 upon entry.

Note: you must set decimal mode (using the SED instruction prior to calling subroutine RANDOM2).

RETURN with:
X-Reg: containing the random number.
Y-Reg: intact if returned random number is less than 128. Otherwise, Y-Reg is returned scrambled.

Note: Upon returning from the subroutine, you must remember to clear decimal mode (by using the CLD instruction). In addition, you must remember to store a $00 in zero page location $48.

Functionally, Subroutine RANDOM1 and Subroutine RANDOM2 are identical; they both generate random numbers in a specified range. But which one would you term the most usable. Imagine having to write a program that uses 15 or 20 different subroutines all of which are as confusing as subroutine RANDOM2!

Conclusion

When we design subroutine modules, we find ourselves struggling to simultaneously optimize at least four different conditions:

A. We want our code to execute quickly
B. We want our code to be compact.
C. We want our module to be flexible (it should contain enough calling parameters to provide the user with many options).
D. We want our documentation to be clear and simple.

Unfortunately, it's almost always impossible to simultaneously satisfy all four of the above conditions. For example, machine code without any loops will execute faster than machine code with loops. The process of looping costs us a certain amount of overhead (such as decrementing a register and then branching). However, not looping is extremely wasteful of code.

Similarly, there will be times when we must violate parts of Rule #2 in order to optimize one or more of the above four conditions (A through D). But then, you must remember that the rules in this paper were presented merely as a set of guidelines. Break them if you must, but only with good cause.

The closer you can adhere to the rules set forth in this paper, the less "toe stepping" will occur in your programs. The whole idea behind the elimination of "toe stepping" is to write subroutine modules in such a way that they are independent (or "insulated") from each other. By writing relocatable, independent modules, it is possible for you to create libraries of your most often-used subroutines. Once they are debugged and working, you can incorporate these modules into future programs, *without having to ever modify (or even look at) their source codes again!* All you need is the object modules and the documentation describing how to use them.

One of the advantages of programming in Applesoft BASIC is that it already contains many such modules (HGR, HPLOT, RND, SQR, etc.) inherently built into the language. Even a beginning programmer in BASIC can quickly and easily access these modules to achieve interesting results with very little programming effort. This kind of "instant gratification" makes programming in higher level languages like BASIC a joyful experience.

Programming in assembly language, on the other hand, tends to be a laborious job. Each line of code does so very little in comparison to what can be done in a single line of a BASIC program. Worse yet, assembly language has none of the built-in modules that are inherent to BASIC. To create an assembly language program that produces an even slightly interesting effect requires not only a seemingly inordinate amount of work, but also a fairly intimate understanding of the computer's hardware architecture.

One of the primary goals of this article is to suggest a standard programming methodology by which even beginning programmers can easily use published software without first having to understand all of the hardware idiosyncrasies of computers and peripherals. By publishing independent modules, programming in assembly language can become almost as easy and fun as programming in BASIC.

In the months ahead, I plan to include many such independent subroutine modules. I hope that my efforts will stimulate other programmers to publish modules of their own. By building upon each other's accomplishments in this manner we are bound to discover many new and amazing capabilities, not only in our computers, but also in ourselves.

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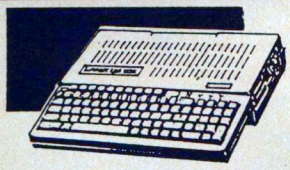

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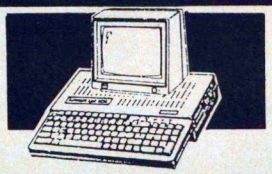

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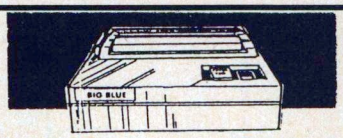

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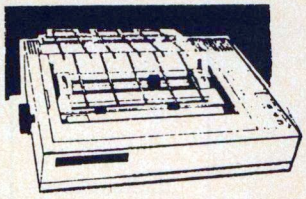

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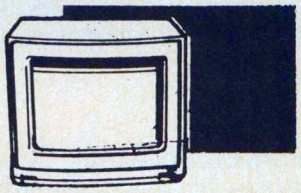

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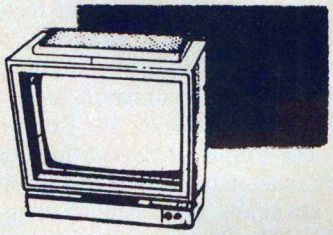

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UniDisk 3.5

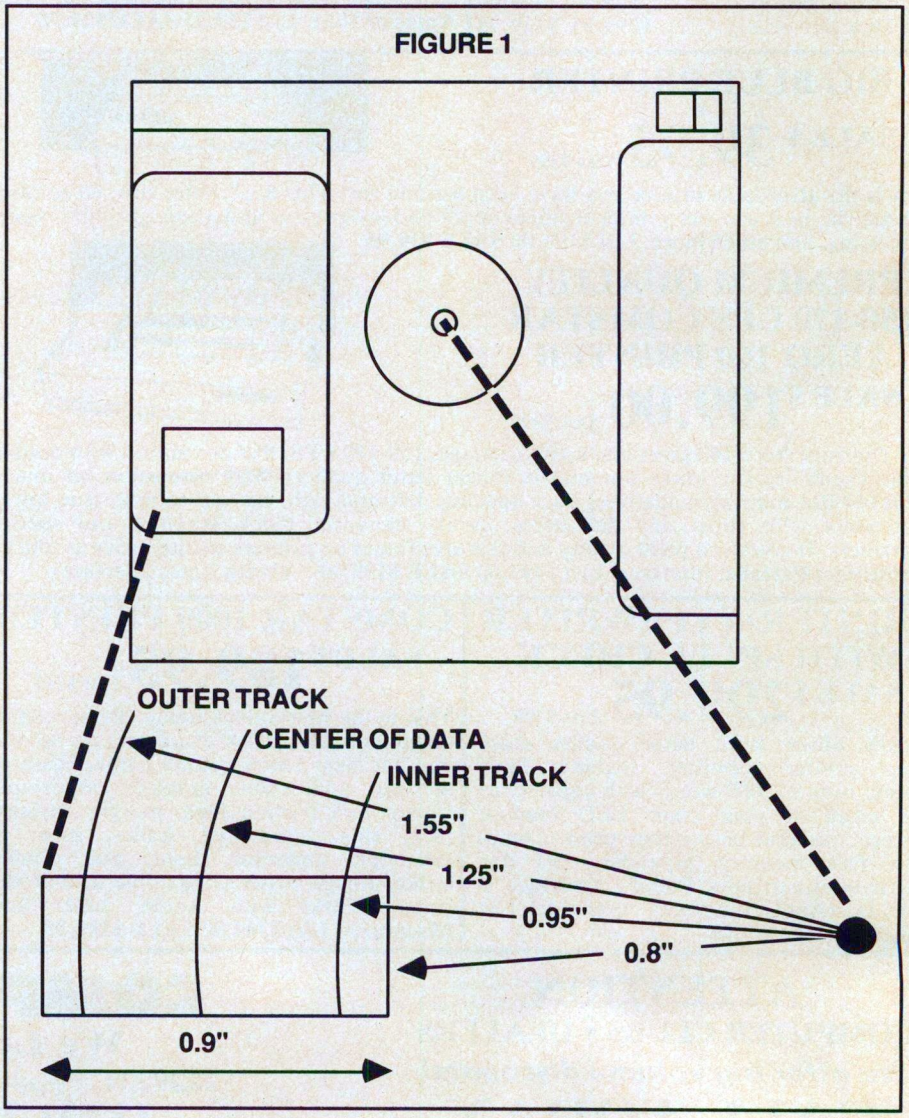
Call -A.P.P.L.E. Tech Notes

Ken Kashmarek

It has been some time now since Apple Computer introduced the UniDisk 3.5 drive. Yet, very little has been written about this unique device. There have been the standard reviews, some which praise the drive, and most which complain about the price. What we have not seen is technical information like that available for the 5.25" floppy disk drive.

Someone always opens up the drive and looks inside. It has its own 6502 processor, and intelligence to respond to the IIe controller card, IIc internal 32K ROMS, or the Macintosh. Everybody who wants this device complains about the high price. Anybody who has used it complains about the not so high performance. Unlike the 5.25" floppy disk drive, the format of the recording surface for the 3.5" microdisk is not well known. The format of the 5.25" drive has been documented more times than there are tracks on the floppy diskette. The format of the 3.5 inch disk is pretty much a mystery. Until recently, I was not really interested, as long as it did the job. Then, early one morning, when all was quiet in the house, I happened to be initializing a new box of 3.5 inch diskettes.

FIGURE 1



Sounds From Within

As the format operation proceeded, the drive sounded different. The time between seek operations (track to track read/write head movement), was getting shorter, or the drive was rotating faster... Or something.

It turns out that the UniDisk 3.5 is a variable speed drive. Depending on the block address, the disk is rotated at a different speed. By listening very carefully, I could count 80 seek operations, changing from track to track. With 80 seek operations on a 1600 block (800K) double sided disk, there are 160 tracks, 80 on the top side and 80 on the bottom side. Simple enough. But, how about the speed change and actual format of the tracks?

With 1600 blocks per disk, and 160 tracks, there should be 10 blocks per track. Since the rotation speed changes,

the outside tracks record more data (slower rotation) than the inside tracks. The outside tracks are recording more than 10 blocks per track, while the inside tracks are recording less than 10 blocks per track. My first breakthrough came while working with a copy protected program on a 3.5" diskette.

Vapor Block

The particular disk in question was nearly full, based on output from the CATALOG command. Yet, the blocks taken by the files totaled less than 800. By using FILER, and the Volume DETECT BAD BLOCKS operation, I found that blocks 0 through 11 (12 blocks) verified okay, while blocks 12-23 (the next 12 blocks) were flagged as bad. This sequence repeated itself for 16 groups of 12 good blocks followed by 12 bad blocks, until blocks 384-394 were okay (11 blocks), while blocks 395-405 were bad (the next 11 blocks). This new sequence repeated itself for a total of 16 groups of 11 good blocks, followed by 11 bad blocks. It appears this copy protected program is stored on one side of the diskette, while the other side is not initialized. I continued this operation to determine the format of the entire diskette.

The 3.5" diskette has 160 recording tracks. The recording tracks are arranged in seek pairs. One track of the pair is on the top side of the disk, while the other track is on the bottom side. In disk drive terminology, each pair of recording tracks is called a cylinder. On much larger disk drives used with mainframe computer systems, there can be as many as 20 tracks, or 10 pairs of recording tracks, in a single cylinder. The ProFile hard disk, used on the Apple III, Lisa, and Apple II, has 4 tracks per cylinder.

For the 3.5" diskette, there are 80 cylinders. The outside cylinder, number 0, contains tracks 0 and 1. Track 0 has 12 blocks, while track 1 also has 12 blocks. This pattern is constant for 16 cylinders (32 tracks) for a total of 384 blocks. The pattern then changes as indicated earlier The 512 byte block recording is grouped in units of 16 cylinders, with a variable number of blocks per track in each group. The entire diskette layout is detailed in Table 1.

From the original introduction of the Macintosh (*Byte* magazine, February 1984), the 400K version of this disk drive is described as having a transfer rate of 489,600 bits per second with a variable rotation speed of 400 RPM to 600 RPM. Therefore, the innermost group of tracks rotates at 10 revolutions per second, or 0.1 second per revolution. One revolution on the innermost track records 48,960 bits, and must hold the encoded data for 8 blocks of 512 bytes each (plus block header, trailer, and sync bytes). Since this drive can handle the original Macintosh diskettes, the data block is actually something like 532 or 542 bytes.

By Guess and By Golly

With a small amount of experimentation, a ruler, and some guess work, I estimate that the innermost track is located about 0.95 inches from the center of the diskette. This produces a linear recording distance of 6 inches. With one track of 48,960 bits spread over 6 inches, we get 8160 bits per inch. So much for the inside track.

The first track (from the center of the disk) of the outside track group must hold 50 percent more data (73,440 bits). This implies a linear recording distance of about 9 inches, or a radius of 1.43 inches. The outside track group extends out to 1.55 inches from the center of the disk. See Figure 1.

Working back through the same calculations, we get a rotation time of

TABLE 1

#Of Cylinders	#Of Tracks	Blocks PerTrack	Total Blocks	%Of Disk
16	32	12	384	24
16	32	11	352	22
16	32	10	320	20
16	32	9	288	18
16	32	8	256	16
===	===		===	===
80	160		1600	100

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about 0.15 seconds, with 6.68 rotations per second, or 400 rotations per minute. See Table 2 for the complete table for all track groups.

Remember, these calculations are estimates based on an a guess for the location of the recording tracks on the 3.5" diskette. If the actual recording density is higher than 8160 bits per inch, then the entire recording area may be moved closer to the center of the diskette. If the density is lower, then it must move further out. The width of the recording surface is 0.9 inches, but only 0.6 inches are used for actual recording.

On a 5.25" floppy diskette, about 50,000 bits are needed to record 4096 bytes of data on a track. With that technique, the recording is in sectors that contain 256 encoded data bytes. If the 3.5" diskette is recording in 512 byte groups (or up to 542 for Macintosh disks), then about 48,000 bits are needed to record 4096 bytes of user data. It appears the data in Table 2 is a reasonable approximation of the specifications of the recording layout for the 3.5" diskette.

TABLE 2

Radius Inches	Circum-ference	#Of Bits	Average Time	Rotations Second	Per Minute
0.955	6.000	48964	0.1000	10.00	600.0
1.074	6.745	55040	0.1124	8.90	533.7
1.192	7.490	61117	0.1248	8.01	480.7
1.311	8.234	67193	0.1372	7.29	437.2
1.429	8.979	73270	0.1497	6.68	400.9

TABLE 3

Block #Read	TotalTime (1000 blocks)	Average milliseconds
0	153	0.153
192	152	0.152
384	141	0.141
560	140	0.140
736	128	0.128
896	128	0.128
1056	115	0.115
1200	115	0.115
1344	102	0.102
1472	103	0.103

An Experiment

One must test the theory to determine its validity. So, a quick experiment was set up to time the reading of certain blocks. Based on the timing, we can determine how accurate the above estimates are. A short program was written to use the READ BLOCK call. Timing information was obtained from a clock card. Since the clock accuracy is one second, a large number of repetitions were used to determine an average time down to the millisecond level. The results are outlined in Table 3.

Since only one block is read per rotation of the disk, the average read time represents an average for one rotation. Note that the observed values are 2 to 4 milliseconds larger than the calculated values. The calculated values did not take into account the seek times to move the head 8 cylinders between different block numbers. These tests were conducted on a single drive. The results may vary slightly for other drives.

Overall, the experimental results are consistent with the calculated results, and generally in agreement.

So, Tell Me More...

However, this information is really only useful for reference purposes. You cannot load a file faster from the inside tracks, even though the device rotates faster. Why? The data still is passing under the read/write head at the same constant data rate. For a large file, there are more seeks because the inside tracks hold less data. Also, the root directory is on the outside track, which means a longer seek to access data on the inside track

But, the device is faster, more reliable, and fun to use. With the UniDisk 3.5, Pascal 1.3 is a pleasure to use. Even the old DOS 3.3 floppy shuffle is reduced (requires a modified version of DOS 3.3, not supplied by Apple Computer). AppleWorks disk swapping is a thing of the past. The drive is a significant advance in disk technology for the Apple II. Even the price is less than the original Disk][and has already dropped (and should continue to drop).

So there you have it. A back of the envelope analysis of the layout of the UniDisk 3.5 drive. Some of the numbers are estimates, but fairly accurate. Without the variable speed rotation, the device would have been limited to 640K. And as time goes on, I am sure that we will hear more about the unique capabilities of the UniDisk 3.5.

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The Penultimate Quit Call

Rick Sutcliffe

Many programs running under ProDOS-8 exit through a standard routine known as the "quit". (Merlin, on which this program was written is one example. Another is the DOS3.3.SYSTEM running under ProDOS.) A quit call is made from machine language in a very straightforward manner and can be POKEd from BASIC using the program BYE which Apple supplies on the ProDOS-8 user's disk.

However, the actual quit routine is somewhat primitive, not at all user-friendly, and has at least one bug which has annoyed developers ever since they were first delivered the operating system. (Apple has always insisted that the "bug" is intentional, and will not fix it.)

Naturally, any such code can be replaced, if one knows how, but before considering the program to do this, let's review how the quit routine acts.

When ProDOS receives a quit call, it places a chunk of its code stored at $D100 through $D399 into the lower part of RAM at $1000, and then gives control to the transferred code. This code in turn does some housekeeping by turning off the 80-column display and ensuring that the various hardware switches are in a "standard" state for the next application.

A message is then printed on the screen asking for the new system prefix and displaying the old one as a default. Once the user responds to this, the next application pathname (which could include a prefix) is requested. This will then be loaded (it must be a type "SYS" file) and its code is jumped to.

The main changes which our replacement routine (which calls itself "Get Next System") makes from that of Apple's are:

(1) One of the switches set by Apple is Alternate Character Set = On. Virtually no program will assume this setting, and many assume the opposite. This is therefore a bug, so we change it.

(2) Apple has no provision for a default application pathname to be stored in the quit routine. Many programmers would like to go to a particular system every time after quitting from a given application. Moreover, in the new routine, if the user wishes to make some new application name the default, this can be accomplished by holding down the open apple when RETURN is pressed to accept the name typed in.

(3) Instead of two routines for parsing lines typed by the user—one for the prefix and a different one for the pathname—Get Next System has only one. It is a little more general, but this allows us to have room for lots more useful code and better messages.

(4) One of the extra goodies included is a little search routine which will offer the device names of all possible devices online as prefix choices if the system (default) prefix is not chosen. If the user wants one of these, RETURN can be pressed with the desired one on the screen. If ESC is pressed instead, the next device name will appear. This speeds things up immensely.

The user of this program is allowed to install the quit call in memory only, where it simply replaces the Apple routine, or to install it on any ProDOS-8 disk so that it boots as part of the operating system. The latter is accomplished by searching the disk for a file called "PRODOS", and then looking through this until it finds the characteristic first twelve bytes of the quit call. (These are the same in all versions produced by Apple.)This approach was adopted because there have been many versions of the eight bit ProDOS produced (1.0.0, 1.0.1, 1.1.0, 1.1.1, 1.2 are the main ones) and these have slightly different quit calls located in different relative blocks on the disk—though all end up in memory at the same place.

There is no danger of ruining a sixteen-bit version of ProDOS (where the quit call is a more sophisticated dispatcher program) because in that system the file called "PRODOS" is just a loader and contains little of the actual operating system code. The installation presented here would, in that case, fall off the end of the PRODOS (16) file looking for the signature bytes and then generate an error message.

Every bootable disk can have its own particular default application pathname in the quit call, as this is set at installation time. Note that because some of the code is used during installation, things are engineered so as to have the main quit routine available at its eventual running address. Its routines can then be used if desired.

Naturally, there are some limitations still present.

(1) It would be nice to have the target disk searched for SYS files and have these offered one at a time as potential applications.

(2) It would be nice to have a list of default application pathnames stored to be offered one at a time.

These limitations could be addressed by removing the subroutine which parses a typed line and then using the monitor GETLN instead, but the ESC would not then work as presented in my listing, more instructions would have to be on the screen, and more invalid file and device names would be accepted at first.

Someone may wish to do this, so we will not claim this is the ultimate in quit routines, just the second-to ultimate.

Finally, since the code runs to over 900 lines, a more detailed breakdown than this brief outline will not be attempted. Instead, we shall assume that anyone interested in mucking about with the heart of ProDOS is already sufficiently well-versed in machine language to be able to follow an assembly listing.

Due to space limitations, we are only including the hex code here. The complete listing is available on PDS disk #502, or members can download it off the Crate. (206) 251-0543.

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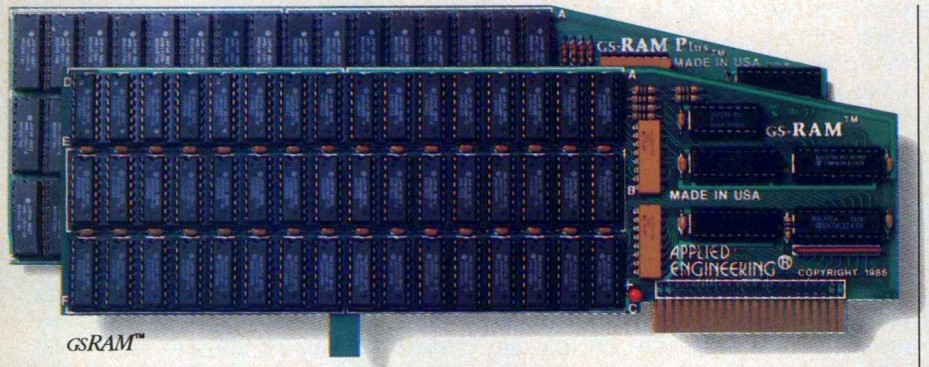
100D: 0E C0 8D 00 C0 A2 17 A9
1015: 01 9D 58 BF CA A9 00 9D
101D: 58 BF CA 10 FA A9 CF 8D
1025: 58 BF 20 39 FB 20 58 FC
102D: A9 0C 85 24 A0 2B 20 53
1035: 11 AD31 BF 85 FF 20 00
103D: BF C7 24 12 AE 80 02 20
1045: F4 11 A9 07 85 25 20 8E
104D: FD A9 02 A0 81 20 6B 11
1055: 90 26 A4 FF 30 CF C6 FF
105D: B9 32 BF 8D 28 12 20 00
1065: BF C5 27 12 D0 EC AD 81
106D: 02 29 0F AA E8 A9 2F 8D
1075: 81 02 9D 81 02 E8 D0 C7
107D: 20 00 BF C6 24 12 90 05
1085: 20 31 11 F0 B1 A2 00 BD
108D: D3 12 9D 81 02 F0 03 E8
1095: D0 F5 8E 80 02 A0 9A A9
109D: 12 A2 0C 86 25 20 6B 11
10A5: B0 83 F0 E1 2C 61 C0 10
10AD: 06 AD81 C0 AD 81 C0 BD
10B5: 81 02 9D D3 D3 9D D3 12
10BD: CA 10 F4 20 00 BF C4 FD
10C5: 11 B0 63 AD 01 12 C9 FF
10CD: F0 04 A9 01 D0 58 A9 00
10D5: 8D 16 12 20 00 BF CC 15
10DD: 12 B0 4B AD 00 12 29 01
10E5: F0 1E 20 00 BF C8 0F 12
10ED: B0 3C AD 14 12 8D 18 12
10F5: 8D 20 12 20 00 BF D1 1F
10FD: 12 B0 2B AD 23 12 F0 04
1105: A9 27 D0 22 AD 21 12 8D
110D: 1B 12 AD 22 12 8D 1C 12
1115: 20 00 BF CA 17 12 B0 0E
111D: 20 00 BF CC 15 12 B0 06
1125: AD 82 C0 4C 00 20 20 31
112D: 11 4C 8A 10 AA 20 3A FF
1135: A9 14 85 25 E0 01 D0 04
113D: A0 6F D0 12 E0 40 F0 0C
1145: E0 44 90 04 E0 47 90 04
114D: A0 7F D0 02 A0 8A A9 12
1155: 85 51 84 50 20 9C FC A0
115D: 00 B1 50 F0 08 09 80 20
1165: ED FD C8 D0 F4 60 20 55
116D: 11 20 9C FC A2 00 20 0C
1175: FD C9 9B D0 0E A4 24 F0
117D: 6F C6 24 C6 25 20 8E FD
1185: 38 B0 E9 C9 95 D0 06 A4
118D: 24 B1 28 D0 0C C9 8D F0
1195: 51 48 8A D0 03 20 42 FC
119D: 68 A6 24 C9 FF F0 04 C9
11A5: 88 D0 0B 8A F0 16 C6 24
11AD: CA 20 9C FC B0 C0 C9 98
11B5: F0 36 C9 AE D0 04 E8 CA
11BD: D0 1A B0 06 20 3A FF 38
11C5: B0 ACC9 DB 90 06 29 DF
11CD: C9 DBB0 F0 C9 BA 90 04
11D5: C9 C1 90 E8 E0 27 B0 E4
11DD: E8 9D 80 02 20 ED FD 38
11E5: B0 8C A6 24 20 F4 11 18
11ED: 08 20 42 FC 28 8A 60 A9
11F5: 00 9D 81 02 8E 80 02 60
11FD: 0A 80 02 00 00 00 00 00
1205: 00 00 00 00 00 00 00 00
120D: 00 00 03 80 02 00 1C 00
1215: 01 00 04 00 00 20 00 01
121D: 00 00 02 00 00 00 00 01
1225: 80 02 02 60 81 02 C7 E5
122D: F4 A0 CE E5 F8 F4 A0 D3
1235: F9 F3 F4 E5 ED 8A 8A A0
123D: D2 A0 D3 F5 F4 E3 EC E9
1245: E6 E6 E5 8D 8D 8D D3 E5
124D: F4 A0 D0 F2 E5 E6 E9 F8
1255: BA A0 A8 D2 C5 D4 AD E1
125D: E3 E3 E5 F0 F4 A0 C5 D3
1265: C3 ADF2 E5 EA E5 E3 F4
126D: A9 00 8D CE EF F4 A0 E1
1275: A0 D3 D9 D3 A0 E6 E9 EC
127D: E5 00 8D C9 AF CF A0 C5
1285: F2 F2 EF F2 00 8D D0 E1
128D: F4 E8 A0 EE EF F4 A0 E6
1295: EF F5 EE E4 00 8D CE E5
129D: F8 F4 A0 E1 F0 F0 EC E9
12A5: E3 E1 F4 E9 EF EE A0 F0
12AD: E1 F4 E8 EE E1 ED E5 BF
12B5: 8D A8 CF F0 E5 EE AD E1
12BD: AD D2 C5 D4 A0 F2 E5 F3
12C5: E5 F4 F3 A0 E4 E5 E6 E1
12CD: F5 ECF4 A9 8D 8D C2 C1
12D5: D3 C9 C3 AE D3 D9 D3 D4
12DD: C5 CD00 00 00 00 00 00
12E5: 00 00 00 00 00 00 00 00
12ED: 00 00 00 00 00 00 00 00
12F5: 00 00 00 00 00 00 20 93
12FD: FE 20 89 FE 20 39 FB 8D
1305: 0C C0 8D 0E C0 8D 00 C0
130D: 20 58 FC A9 05 85 24 A9
1315: 14 A0 FA 20 55 11 20 E2
131D: 14 20 F0 14 A9 15 A0 B7
1325: 20 55 11 20 E2 14 C9 B4
132D: D0 03 4C 58 FC C9 B3 D0
1335: 0D 20 00 BF 65 3C 13 04
```

Insist on GSRAM™ When You Buy Your IIGS™

Expand the IIGS RAM and ROM with the GSRAM or GSRAM Plus with ROM Pak. Available now with 256K to 8 MEG!

GSRAM Plus™



GSRAM™

Remember the 16K cards for the II+ and the 64K cards for the IIe? At the time, that much memory seemed like a lot. But when the owners of these memory cards came to us for more memory, many had to throw away their smaller Apple memory cards or try to sell them. Most of our customers told us that had they known about Applied Engineering's larger memory cards when they bought their Apple, they would have purchased them at the same time.

GSRAM and GSRAM Plus are available now, allowing up to 8 MEG of memory expansion. That's 8 times the memory capacity of Apple's card and just look at the benefits that only GSRAM and GSRAM Plus have over Apple's card:

- Lower cost
- Has 6 RAM banks (Apple's card has 4)
- Has memory expansion port
- Has ROM expansion port
- No configuration blocks to set
- No soldered in RAM chips
- Expandable to 8 MEG
- Expands AppleWorks internal limits
- Built-in Hi-Res self-diagnostic software
- 5 year hassle free warranty (Apple has a 90 day warranty)
- Made in USA

GSRAM for More AppleWorks Power

Only GSRAM and GSRAM Plus eliminates AppleWorks internal memory limits, increasing the maximum number of records available from 6,000 to over 25,000 and only GSRAM and GSRAM Plus increases the number of lines permitted in the word processing mode from 6,000 to over 15,000. And only GSRAM and GSRAM Plus offers a built-in printer buffer so you can continue using AppleWorks while your printer is printing. GSRAM and GSRAM Plus even expand the number of lines in the clipboard from 255 to 2047 and will auto segment large files so they can be saved on two or more disks. You can even have Pinpoint or Macroworks and your favorite spelling checker in RAM for instant response. GSRAM and GSRAM Plus will even display the time and date right on the AppleWorks screen. Nothing comes close to enhancing AppleWorks so much.

Turn Your IIGS into a Giant

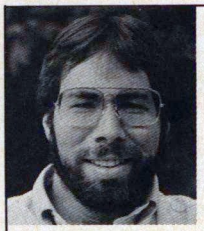
Simply plug GSRAM into the IIGS memory expansion slot and you've got up to *8 megabytes* of RAM at your fingertips—all of it instantly and automatically recognized by the IIGS. GSRAM is compatible with all IIGS software, including AppleWorks, as well as BASIC®, ProDos, DOS 3.3, PASCAL®, "C" and CP/M®.

Grow by Bytes or Megabytes

We offer GSRAM in two configurations so you can increase your memory 256K at a time (GSRAM) or a megabyte at a time (GSRAM Plus). Both offer full compatibility, lower cost than other boards, and easy expandability. And both are extremely low in power consumption. A fully expanded GSRAM operates at only 375 ma, and GSRAM Plus at only 270 ma (even with 6 megabytes on board!)

GSRAM—for Normal Memory Requirements

GSRAM is available with 256K, 512K, 1 MEG or 1.5 MEG of memory already on board. If you don't need the full 1.5 MEG now, you can choose a GSRAM with less memory and expand it up to 1.5 MEG in the future—or upgrade to GSRAM Plus for a small charge.



"I recommend Applied Engineering products wholeheartedly."

Steve Wozniak, the creator of Apple Computer

With an optional piggyback card, you can expand GSRAM even higher than 1.5 MEG! (Other cards are only expandable to 1 MEG.)

GSRAM Plus—for Growing by Leaps and Bounds

GSRAM Plus is the first Apple memory card to use 1 MEG RAM chips on the main board. It's available with 1 to 6 MEG on board. If you don't need the whole 6 MEG now, you can buy a GSRAM Plus with less memory and easily expand it in the future.

GSRAM Plus can be expanded up to 8 MEG with an optional piggyback card.

Easy Expansion

Both GSRAM and GSRAM Plus use standard RAM chips that are readily available and just plug right in. So unlike other cards, you'll find expanding your GSRAM or GSRAM Plus easy, convenient and very economical. And with our optional ROM expansion module you can even increase the IIGS's ROM space and all in just one slot.

Quality and Support of the Industry Leader

Applied Engineering is the largest supplier of Apple peripherals in the world. We *invented* the first large RAM cards for the Apple. With a 5-year "no-hassle" warranty and outstanding technical support, you can be sure GSRAM and GSRAM Plus will deliver the performance you're looking for—or return them within 15 days for a full refund.

GSRAM with 256K	**$169**
GSRAM with 512K	**$219**
GSRAM with 1 MEG	**$299**
GSRAM with 1.5 MEG	**$379**
GSRAM with 2-8 MEG	**CALL**
GSRAM Plus with 1-8 MEG	**CALL**

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```
133D: 00 00 00 00 00 C9 B1
1345: D0 50 AD 81 C0 AD 81 C0
134D: A9 10 85 3D A9 00 85 3C
1355: A9 12 85 3F A9 FA 85 3E
135D: A9 D1 85 43 A0 00 84 42
1365: 20 2C FE 20 AF 14 B0 27
136D: AD 81 C0 AD 81 C0 BD 81
1375: 02 9D D3 D3 9D D3 12 CA
137D: 10 F4 AD 82 C0 20 F0 14
1385: 20 3A FF A9 16 A0 BD 20
138D: 55 11 A0 0C 20 D9 14 4C
1395: 1E 13 C9 B2 D0 83 20 F0
139D: 14 A9 16 A0 E6 20 55 11
13A5: AD 31 BF 85 FF 20 00 BF
13AD: C7 24 12 AE 80 02 20 F4
13B5: 11 A9 0F 85 25 20 8E FD
13BD: A9 02 A0 81 20 6B 11 90
13C5: 26 A4 FF 30 CA C6 FF B9
13CD: 32 BF 8D 28 12 20 00 BF
13D5: C5 27 12 D0 EC AD 81 02
13DD: 29 0F AA E8 A9 2F 8D 81
13E5: 02 9D 81 02 E8 D0 C7 20
13ED: 00 BF C6 24 12 90 05 20
13F5: 31 11 F0 B1 20 AF 14 B0
13FD: 96 BD81 02 9D D3 12 CA
1405: 10 F7 AE 57 17 BD 57 17
140D: 9D 80 02 CA 10 F7 A9 0A
1415: 8D 67 17 20 00 BF C4 67
141D: 17 B0 43 AD 6A 17 8D 5E
1425: 17 09 02 8D 6A 17 A9 07
142D: 8D 67 17 20 00 BF C3 67
1435: 17 B0 6B 20 00 BF C8 0F
143D: 12 B0 63 AD 14 12 8D 60

144D: 1B 0A 8D 22 12 A9 00 8D
1455: 21 12 8D 23 12 EE 22 12
145D: 20 00 BF CE 1F 12 B0 3E
1465: 20 00 BF CA 17 12 B0 36
146D: A2 0B BD 00 20 DD 00 10
1475: D0 E3 CA 10 F5 20 00 BF
147D: CE 1F 12 B0 21 20 00 BF
1485: CB 5F 17 B0 19 20 00 BF
148D: CC 15 12 B0 11 AD 5E 17
1495: 8D 6A 17 20 00 BF C3 67
149D: 17 B0 03 4C 82 13 20 31
14A5: 11 A4 25 C8 20 D9 14 4C
14AD: 9B 13 20 F0 14 A9 16 A0
14B5: 5C 20 55 11 A2 00 BD D3
14BD: 12 9D 81 02 F0 03 E8 D0
14C5: F5 8E 80 02 A0 D3 A9 12
14CD: A2 0E 86 25 20 6B 11 B0
14D5: 02 F0 E1 60 84 25 A9 15
14DD: A0 98 20 55 11 A9 60 20
14E5: ED FD AD 00 C0 10 FB 8D
14ED: 10 C0 60 A9 08 85 25 20
14F5: 8E FD 4C 42 FC C9 EE F3
14FD: F4 E1 EC EC A0 CE E5 F7
1505: A0 D0 F2 EF C4 CF D3 A0
150D: D1 F5 E9 F4 A0 D2 EF F5
1515: F4 E9 EE E5 8D 8D C3 EF
151D: F0 F9 F2 E9 E7 E8 F4 A0
1525: B1 B9 B8 B6 A0 A0 A0 A0
152D: A0 E2 F9 A0 A0 A0 A0 A0
1535: D2 AE A0 D3 F5 F4 E3 EC
153D: E9 E6 E6 E5 8D 8D 8D C2
1545: EF F8 A0 B1 B2 B5 B3 A0
154D: C1 EC E4 E5 F2 E7 F2 EF

1555: F6 E5 A0 C2 AE C3 AE A0
155D: C3 C1 CE C1 C4 C1 A0 A0
1565: D6 B0 D8 A0 B1 C1 B0 8D
156D: 8D 8D C4 E9 F3 F4 F2 E9
1575: E2 F5 F4 E5 E4 A0 E1 F3
157D: A0 F3 E8 E1 F2 E5 F7 E1
1585: F2 E5 A0 AD A0 F3 E1 F9
158D: AC A0 A4 B3 AE B0 B0 BF
1595: 8D 8D 8D 8D D0 F2 E5 F3
159D: F3 A0 E1 EE F9 A0 EB E5
15A5: F9 A0 F4 EF A0 E3 EF EE
15AD: F4 E9 EE F5 E5 A0 BD BD
15B5: BE 00 C4 EF A0 F9 EF F5
15BD: A0 F7 E9 F3 E8 A0 F4 EF
15C5: BA 8D 8D B1 AE A0 C9 EE
15CD: F3 F4 E1 EC EC A0 F1 F5
15D5: E9 F4 A0 E3 E1 EC EC A0
15DD: E9 EE A0 ED E5 ED EF F2
15E5: F9 8D B2 AE A0 C9 EE F3
15ED: F4 E1 EC EC A0 F1 F5 E9
15F5: F4 A0 E3 E1 EC EC A0 EF
15FD: EE A0 E1 A0 E4 E9 F3 EB
1605: 8D B3 AE A0 CC E5 E1 F6
160D: E5 A0 F6 E9 E1 A0 F4 E8
1615: E5 A0 F1 F5 E9 F4 A0 E3
161D: E1 EC EC 8D B4 AE A0 D2
1625: E5 F4 F5 F2 EE A0 E6 F2
162D: EF ED A0 F7 E8 E5 EE E3
1635: E5 A0 F9 EF F5 A0 E3 E1
163D: ED E5 8D 8D D0 E9 E3 EB
1645: A0 EF EE E5 A0 A8 B1 A0
164D: AD A0 B4 A9 A0 E8 E5 F2
1655: E5 A0 BD BD BD BE 00 8D
165D: D7 E8 E1 F4 A0 F0 E1 F4
1665: E8 EE E1 ED E5 A0 F3 E8
166D: EF F5 EC E4 A0 C9 A0 F3
1675: F4 EF F2 E5 A0 F4 EF A0
167D: E7 E9 F6 E5 A0 E1 F3 8D
1685: F4 E8 E5 A0 E4 E5 E6 E1
168D: F5 EC F4 A0 F7 E8 E5 EE
1695: A0 C9 A0 F0 F2 EF ED F0
169D: F4 BA 8D 8D CE E5 F8 F4
16A5: A0 E1 F0 F0 EC E9 E3 E1
16AD: F4 E9 EF EE A0 F0 E1 F4
16B5: E8 EE E1 ED E5 BF 8D 00
16BD: C1 F0 F0 EC E5 A7 F3 A0
16C5: F1 F5 E9 F4 A0 F2 EF F5
16CD: F4 E9 EE E5 A0 E8 E1 F3
16D5: A0 E2 E5 E5 EE A0 F2 E5
16DD: F0 EC E1 E3 E5 E4 8D 8D
16E5: 00 D0 EC E5 E1 F3 E5 A0
16ED: E7 E9 F6 E5 A0 F0 F2 E5
16F5: E6 E9 F8 A0 EF E6 A0 E4
16FD: E9 F3 EB A0 F7 E8 E5 F2
1705: E5 A0 D0 D2 CF C4 CF D3
170D: 8D E6 E9 EC E5 A0 F4 EF
1715: A0 E2 E5 A0 E3 E8 E1 EE
171D: E7 E5 E4 A0 E9 F3 A0 EC
1725: EF E3 E1 F4 E5 E4 AE 8D
172D: A8 C5 D3 C3 A0 F2 E5 F3
1735: F4 E1 F2 F4 F3 A0 EC E9
173D: EE E5 A0 EF F2 A0 E7 E9
1745: F6 E5 F3 A0 EE E5 F7 A0
174D: E3 E8 EF E9 E3 E5 A9 8D
1755: 8D 00 06 D0 D2 CF C4 CF
175D: D3 00 04 00 00 10 FB 02
1765: 00 00 0A 80 02 00 00 00
176D: 00 00 00 00 00 00 00 00
1775: 00 00 00 00
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We've just added a raft of new features to our popular UniDOS 3.3, the operating system that gives you big 800K storage capacity on tiny 3.5" disks — and DOS 3.3 compatibility!

UniDOS 3.3 Plus gives you all of the features of UniDOS 3.3, plus:

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- Amazing new DOS 3.3 CAT command for wildcard searching, two-column file name display (80-column //e or //c), and alphabetized directories!
- Initializes both 3.5" and 5.25" disks!
- Works just like standard DOS 3.3 — doesn't take up any additional main memory!

What's UniDOS 3.3 Plus?
Apple's 800K UniDisk 3.5 drive offers five times the storage capacity of floppy disks — but no support for Apple's older DOS 3.3 operating system. MicroSPARC's UniDOS 3.3 Plus operating system for Apple II series computers fills this gap for the thousands of programs and data files that exist under standard DOS 3.3. UniDOS 3.3 Plus works with all Applesoft programs, but doesn't work with most commercial or copy-protected software.

UniDOS 3.3 Plus provides the best of both worlds — big 800K disk capacity with complete DOS 3.3 compatibility.

Key features are:
- Two 400K volumes per disk
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- Up to 434 files per disk.
- Both 5.25 inch and 3.5 inch drives may be mixed in a single Apple system
- Support for older 48K Apple II Plus computers

UniDOS 3.3 Plus runs on any of the Apple II series computers and comes with a user manual that includes technical data for machine language programmers. Software developer licensing is available.

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- If you've already purchased one of our competitors' DOS 3.3 products for the UniDisk 3.5, here is a special incentive to upgrade to UniDOS 3.3 Plus: just send us the original disk containing the competing product, and we'll give you $5.00 off the price of UniDOS 3.3 Plus — you pay only $24.95!

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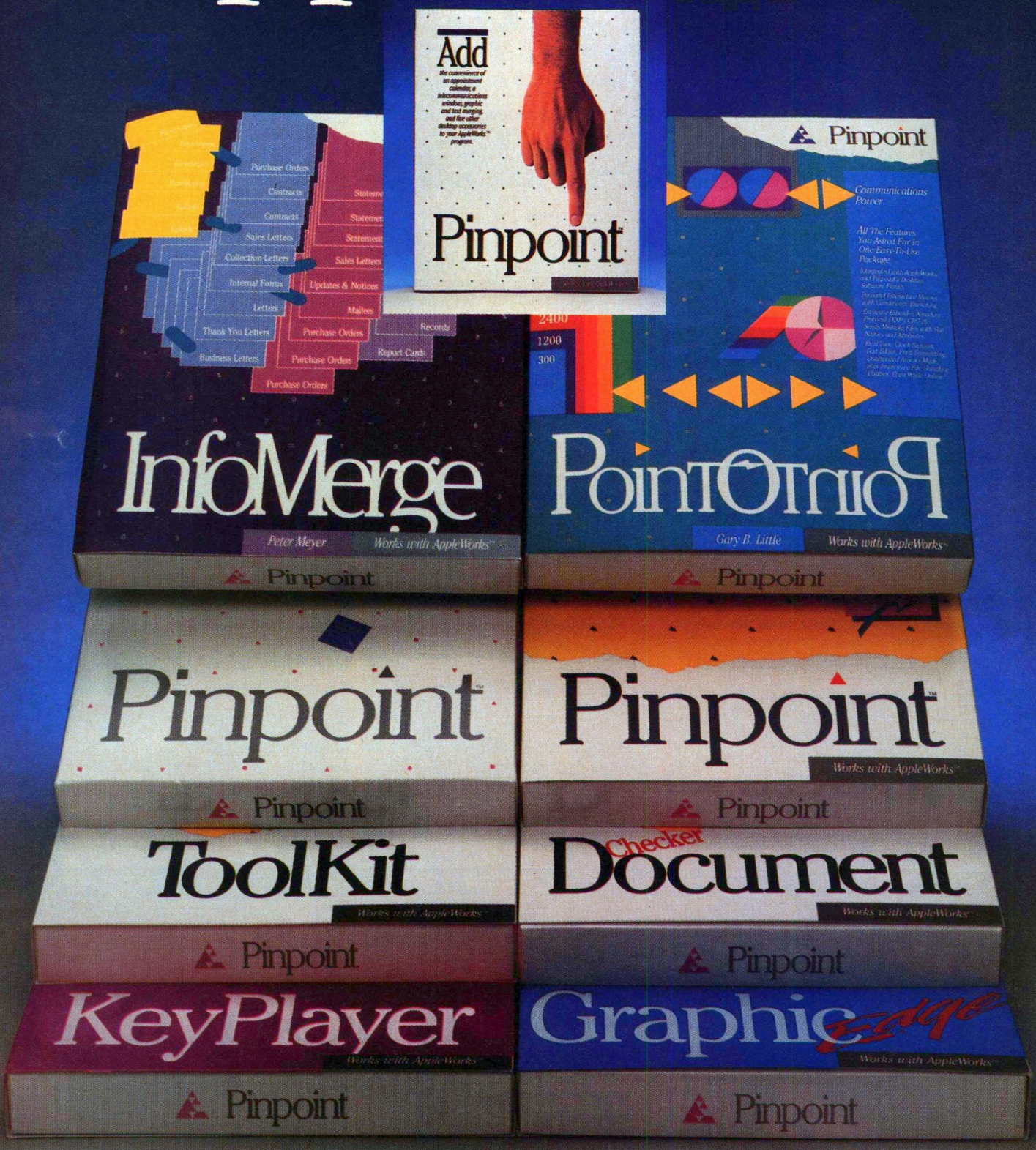
AppleWorks™



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SPELLING CHECKER

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SPDC	99.00	Spelling & Document Checker	☐
SP	69.00	Pop-up Spelling Checker	☐
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AppleWorks Rank Ordering

Harold Shuckhart

Most teachers use rank ordering in one way or another. The most common way is with a histogram. After a class has taken a test and the teacher has scored it, the teacher may mark a frequency distribution or histogram on the board. A histogram for thirty students taking a 20 item test might look like Figure 1.

FIGURE 1

```
20 - |
19 - ||
18 - |
17 - |||
16 - |||
15 - ||||||
14 - |||
13 - |||||
12 - ||||
11 -
10 - ||
```

The teacher might now make some slashes to indicate grade breaks, as seen in Figure 2.

FIGURE 2

```
20 - |
19 - ||      A
18 - |
17 - |||
16 - |||     B
15 - ||||||
14 - |||
13 - |||||
12 - ||||    C
11 -
10 - ||      D
```

What a histogram does is rank order the students. Each student is being compared to all other students. The students who rank high—low rank number—are given good grades. Those who rank low—high rank number—are given poor grades. Why are the slashes drawn in those locations? Many teachers would say, "From experience." or "You look for the natural breaks."

Clearly, there are problems with this kind of rank order grading, when the lowest ranked genius in a class of geniuses is considered to fail, but those are issues to be discussed elsewhere. Grades based on rank order are valid in a heterogeneous class setting.

One of the important uses of rank order is the information it conveys to the student. If a student ranks 15th in a class of thirty on one test and 27th on the next, he or she knows that something has changed. Both test scores may be 70%, but clearly one is poorer than the other, since half the class did worse than the student on the first test, but only 10% did worse on the second.

My personal interest in rank order developed from a class in testing and evaluation. One of the issues we discussed was how to weight or value tests, projects, homework, etc., in determining a grade. What I wanted was an easy way to determine a student's rank on a set of tests and see how different weightings affected the student's final score.

The simple rank method of determining rank is to make a list of the scores and number them. Using the scores above we get Figure 3.

FIGURE 3

```
20 - 1     15 - 16
19 - 2     14 - 17
19 - 3     14 - 18
18 - 4     14 - 19
17 - 5     13 - 20
17 - 6     13 - 21
17 - 7     13 - 22
16 - 8     13 - 23
16 - 9     13 - 24
16 - 10    12 - 25
15 - 11    12 - 26
15 - 12    12 - 27
15 - 13    12 - 28
15 - 14    10 - 29
15 - 15    10 - 30
```

Although we now have a rank number assigned to each score, there is an obvious question, of the four students

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who scored 12 points, which one is rank 25 and which is rank 28? This could be a sticky question if the teacher said passing is being above 10% of the class or rank 27!

To avoid the confusion, we must assign the same rank number to all students with the same score. We do this by averaging the ranks for all duplicate values.

FIGURE 4

20	- 1	15	-	13.5
19	- 2.5	14	-	18
19	- 2.5	14	-	18
18	- 4	14	-	18
17	- 6	13	-	22
17	- 6	13	-	22
17	- 6	13	-	22
16	- 9	13	-	22
16	- 9	13	-	22
16	- 9	12	-	26.5
15	- 13.5	12	-	26.5
15	- 13.5	12	-	26.5
15	- 13.5	12	-	26.5
15	- 13.5	10	-	29.5
15	- 13.5	10	-	29.5

To do this for many different tests is time consuming, and there is the possibility of error. I wanted a process I could put into practice and use without using up large quantities of my precious time. I could have easily written a BASIC program to determine ranks from a set of input scores, but I don't use a BASIC program for doing my grades. I use AppleWorks, so I wanted a ranking process I could stick into a spreadsheet.

Working with just the top 16 scores, they would be entered into the spreadsheet as shown in Figure 5.

FIGURE 5

	A	B	C
8			
9	student	score	
10			
11	1	17	
12	2	17	
13	3	16	
14	4	20	
15	5	18	
16	6	16	
17	7	19	
18	8	19	
19	9	17	
20	10	15	
21	11	15	
22	12	16	
23	13	15	
24	14	15	
25	15	15	
26	16	15	
27			

These scores would then be arranged in descending order using OA-A, 4. (open-apple A, arrangement, values from 9 to 0). A simple order can be applied by letting the top score be 1 and each succeeding cell 1 + the previous cell. [Put a 1 in the first cell, C11. Then in C12 put 1+C11. Use the copy function to copy C12, relative, down column C to C26.] See Figure 6.

I could at this point, determine the ranks by inspection from the simple order and the number of duplicates, but I choose not to.

The first problem in setting up the spreadsheet was determining how many matches were occuring in a set of scores. To do this I used the @IF function to look ahead at the column of scores.

[The @IF function evaluates an expression and returns one of two values. @IF(EXPRESSION,TRUE,FALSE). @IF(A1=A2,1,0) returns a 1 if A1 equals A2, and a 0 if A1 is not equal to A2.]

In this case, the scores start in cell B11 and run through B26. In cell D11, put @IF(B11=B12,1,0) + @IF(B11=B13,1,0) + @IF(B11=B14,1,0). If only the first two are equal, this expression is evaluated as 1. If all four of the first values are equal, this expression is evaluated as 3. In other words, it counts the number of duplicates of the first score. Since AppleWorks is limited to 75 characters in an expression, this expression can only look ahead three scores. To allow for the possibility that more than four scores might be the same, we can make a similar expression in column E. In E11, put @IF(B11=B15,1,0) + @IF(B11=B16,1,0) + @IF(B11=B17,1,0). F11, the sum of D11 and E11 is the number of duplicates of B11 in the set B12 through B17. These expressions are copied, relative, in columns D, E, and F for rows 12 through 26. See Figure 7.

The numbers in column F show the number of duplicates in the next six cells under the cell being examined. I can now write an expression to yeild the rank, by taking the number of duplicates into consideration. This is the simple rank plus one half the number of duplicates. In cell G11, put C11 + (F11/2),

FIGURE 6

	A	B	C	D
8				simple
9	student	score		order
10				
11	4	20		1
12	7	19		2
13	8	19		3
14	5	18		4
15	1	17		5
16	2	17		6
17	9	17		7
18	3	16		8
19	6	16		9
20	12	16		10
21	10	15		11
22	11	15		12
23	13	15		13
24	14	15		14
25	15	15		15
26	16	15		16
27				

FIGURE 7

	A	B	C	D	E	F	G
8			simple	compare	f	for	
9	student	score	order	2-4	5-7	sum	
11	4	20	1	0	0	0	
12	7	19	2	1	0	1	
13	8	19	3	0	0	0	
14	5	18	4	0	0	0	
15	1	17	5	2	0	2	
16	2	17	6	1	0	1	
17	9	17	7	0	0	0	
18	3	16	8	2	0	2	
19	6	16	9	1	0	1	
20	12	16	10	0	0	0	
21	10	15	11	3	2	5	
22	11	15	12	3	1	4	
23	13	15	13	3	0	3	
24	14	15	14	2	0	2	
25	15	15	15	1	0	1	
26	16	15	16	0	0	0	
27							

and copy, relative, down column G. See Figure 8

The column labeled "better rank" is a better rank than the simple rank. The first value of a set of duplicates is given the correct rank, but all subsequent values are off by increasing amounts of 0.5. This would still be workable, however, if I was willing to edit column G, with each duplicate value being given the rank of the first value of the duplicate set. This is still too much work. I want an automatic procedure!

The comparison so far has been only in looking forward. Let's also look backwards and compare, by adding two columns to look back 2 - 4 and 5 - 7 values. The expressions would be very similar to those that look ahead.

Move column F and G over by inserting two columns and use new F and new G for the backwards comparison.

In cell F11, put @IF(B11=B10,1,0) + @IF(B11=B9,1,0) + @IF(B11=B8, 1,0). In G11, put @IF(B11=B7,1,0) + @IF(B11=B6,1,0) + @IF(B11=B5,1,0). Even though all of cells B10 through B6 are non-value cells, the comparsion still

FIGURE 8

	A	B	C	D	E	F	G	H	I
8			simple		compare			better	
9	student	score	order		2-4	5-7	sum	rank	
10									
11	4	20	1		0	0	0	1	
12	7	19	2		1	0	1	2.5	
13	8	19	3		0	0	0	3	
14	5	18	4		0	0	0	4	
15	1	17	5		2	0	2	6	
16	2	17	6		1	0	1	6.5	
17	9	17	7		0	0	0	7	
18	3	16	8		2	0	2	9	
19	6	16	9		1	0	1	9.5	
20	12	16	10		0	0	0	10	
21	10	15	11		3	2	5	13.5	
22	11	15	12		3	1	4	14	
23	13	15	13		3	0	3	14.5	
24	14	15	14		2	0	2	15	
25	15	15	15		1	0	1	15.5	
26	16	15	16		0	0	0	16	
27									

FIGURE 9

	A	B	C	D	E	F	G	H	I	J
8			simple	compare	f	compare	b	for	bac	true
9	student	score	order	2-4	5-7	2-4	5-7	sum	sum	rank
10										
11	4	20	1	0	0	0	0	0	0	1
12	7	19	2	1	0	0	0	1	0	2.5
13	8	19	3	0	0	1	0	0	1	2.5
14	5	18	4	0	0	0	0	0	0	4
15	1	17	5	2	0	0	0	2	0	6
16	2	17	6	1	0	1	0	1	1	6
17	9	17	7	0	0	2	0	0	2	6
18	3	16	8	2	0	0	0	2	0	9
19	6	16	9	1	0	1	0	1	1	9
20	12	16	10	0	0	2	0	0	2	9
21	10	15	11	3	2	0	0	5	0	13.5
22	11	15	12	3	1	1	0	4	1	13.5
23	13	15	13	3	0	2	0	3	2	13.5
24	14	15	14	2	0	3	0	2	3	13.5
25	15	15	15	1	0	3	1	1	4	13.5
26	16	15	16	0	0	3	2	0	5	13.5
27										

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works, and makes sense for lower cells. Column H is the forward sum, column I is the backward sum, and column J is the true rank. The true rank is found by adding one half the forward sum to the simple order, to get the "better rank" and then correcting by subtracting one half the backward sum. In J11, put ((C11+(H11/2))-(I11/2), and copy, relative, down column J. See Figure 9.

To keep from having to type all those expressions in each time I want to make a comparison, I moved the table down several rows and copied, relative, the first data row to a set of cells about 9 rows higher. This seed row looks at only non-value cells, but can be copied down into the table whenever I want it and no rearrangement of the data table will affect the seed row. See Figure 10.

In practice, I type in the scores for the students, arrange them in descending order, and put in the simple rank column. I then copy the data set for columns D through J, from the seed row, into as many rows as I have students. All the copying would be relative. O-A K and I have the true ranks to work with. The whole process takes only a little longer than the time to type in the scores, and to do an arrangement.

If I were working with a group where I have more than seven of any score, I can add an additional forward comparison column and an additional backward comparison column and then work with up to 10 duplicates.

Columns C through I can be reduced to width one and formatted to one decimal place. Those columns will now show as # and they will not distract from the important parts of the table.

As a final touch, a column of percentile ranks can be added in column L. Cell L11 is (@COUNT(B11...B26)-J11) /@COUNT(B11...B26). Change the layout to percent, 0 places, and copy, relative, down column L. See Figure 11.

This is just one short example of possible uses for AppleWorks. As needs arise, new uses will develop.

FIGURE 10

	A	B	C	D	E	F	G	H	I	J
2										
3										
4										
5										
6										
7										
8										
9				3	3	3	3	6	6	0
10										
11										
12										
13										
14										
15										
16										
17										
18			simple	compare	f	compare	b	for	bac	true
19	student	score	order	2-4	5-7	2-4	5-7	sum	sum	rank
20										
21	4	20	1	0	0	0	0	0	0	1
22	7	19	2	1	0	0	0	1	0	2.5
23	8	19	3	0	0	1	0	0	1	2.5

FIGURE 11

	A	B	C	D	E	F	G	H	I	J	K	L	M
8										true		%ile	
9	student		score							rank		rank	
10													
11	4		20#######							1		94%	
12	7		19#######							2.5		84%	
13	8		19#######							2.5		84%	
14	5		18#######							4		75%	
15	1		17#######							6		62%	
16	2		17#######							6		62%	
17	9		17#######							6		62%	
18	3		16#######							9		44%	
19	6		16#######							9		44%	
20	12		16#######							9		44%	
21	10		15#######							13.5		16%	
22	11		15#######							13.5		16%	
23	13		15#######							13.5		16%	
24	14		15#######							13.5		16%	
25	15		15#######							13.5		16%	
26	16		15#######							13.5		16%	
27													

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Working with Macros within Spreadsheets

Part 1

Jeffrey M. Jacques

All of us who have been working with electronic spreadsheets over the past few years have noted that they have increased in power and performance. The first generation of VisiCalc gave us the concept of a structured worksheet, a limited set of commands, and some important functions. The second generation spreadsheet programs expanded the number of functions, enabled one to define the attributes of cells, and expanded the flexibility of formatting the worksheet and display area. This is true of such programs as MagiCalc/THE Spreadsheet, VisiCalc, Advanced Version, Multiplan, etc. Integrated packages such as AppleWorks may not have kept all of the functions or expanded the number of functions available, but they have kept the display flexibility and the cell attribute definitions of the second generation packages.

The New Generation

With the development of third generation spreadsheet software (e.g., SuperCalc3/-SuperCalc4, Lotus 1-2-3, Excel), we saw the addition of graphics, simple data base power, and expanded functions. While these are nice additions to spreadsheet software, they are not the big difference in these programs. In my judgement, the big difference between third/fourth generation spreadsheets and earlier models of this genre of software is the inclusion and documented use of macros. You say that you don't know what a macro is. For those not familiar with macros, they are a set of standard instructions which tell your spreadsheet to:

1. insert values or functions at specific worksheet locations,
2. reformat the worksheet area, and
3. automate the performance of spreadsheet commands.

Basically, macros enable you to store a series of keystrokes—whether it be in RAM or in a file and execute them with the press of a couple of keys. As long as you have to do the same set of commands, macros are efficient tools since they require only one entry. Then this macro can be executed when you like and as often as you like. Thus, with the creation of standard macros you can save yourself enormous time and effort—if you use your spreadsheet software to perform these same repetitive steps. This is especially true if:

1. you have complex templatesyou wish to use several times but wish to enter unique data each time,
2. you need to format worksheets, or
3. enter a sophisticated command sequence. In each case, you have to create the macro only once.

(While I am aware that such add on packages as VersaCalc enabled users of first generation spreadsheet software to create macros, we were always left with the feeling that they were true add-ons; the feeling was that the next version of VisiCalc or the alternate more advanced spreadsheet software would not support the use of these macros. Alas, this is exactly what happened to many of us who moved on to more "advanced" spreadsheet software packages.)

Why this lesson in history? It points out that those who develop and market these third and fourth generation spreadsheet application packages have increasingly emphasized the importance of macros. Indeed, it is through macros that current spreadsheet software gets much of its power. Indeed, some may argue that macros enable spreadsheet software to begin to approach the standards of a simple computer language. This history, then, helps to set the stage for the article this and the next installment—designing and using spreadsheet macros.

Still not convinced? Here are a couple of examples we shall explore in these articles. First, assume that you have a sophisticated template which uses cells from A1 through AZ65. Because of the nature of your template you have to enter values in relatively few cells which are scattered throughout the worksheet area. Rather than trying to find the appropriate cell somewhere in the worksheet, why not create and use a macro which can automatically insert the appropriate values in the appropriate cells with a couple of keystrokes?

Here's a second example. Let's assume that you or someone else who knows little about working with spreadsheet software has to do quite a bit of data entry and produce sophisticated reports. Data entry is best done when a set of contiguous cells can be used. While this may be best for data entry, such an approach is often terrible when you have to produce final sophisticated reports and share information. Why not use one or more macros to reformat a standard worksheet and easily create well structured printouts with a couple of keystrokes?

Now that I know that I can save time and energy, how do I do it? We shall demonstrate three macro applications on three different spreadsheet software packages:

1. MagiCalc/ THE Spreadsheet,
2. AppleWorks, and
3. SuperCalc3a.

The macro for THE Spreadsheet will demonstrate how you can develop a data entry template which will automatically transfer data to a complex worksheet. The macro for AppleWorks will demonstrate how you can easily and automatically reformat a worksheet for printing reports. Finally, we shall explore two macros for SuperCalc3a. They will use the data base option of SuperCalc and harness the power of a macro to automate the production of service records and invoices. Thus, we shall explore the three major Apple spreadsheet software packages and note how one can use macros for each. But the caveat noted above still holds: macros are software and machine dependent. So the steps for producing these different macros are not necessarily transportable across these spreadsheet packages; although, with some careful work, the basic ideas are often transportable. More importantly, when chosing your next spreadsheet software, you will know why you wish to purchase one that supports macros.

A MagiCalc Macro

As we noted above, a macro is simply a set of keystrokes you have saved in RAM or on a file. By saving commands on a file, you can order MagiCalc and your Apple to do things in a fast and accurate manner. First, you load your standard template. Then you can load this new file—the one with your macro commands—over an existing template. Such an approach enables you to write over the referenced cells and replace what was there previously with the new information. Confused? Read on.

Perhaps the best place to begin is by examining a simple MagiCalc worksheet and the file stored which produced it. See Table 1 which lists a simple data entry structure of people (column A) and semi-weekly allowances (column B). Row 5 simply @SUMs the individual amounts to create a total. If you look immediately below this table output, you will see a copy of the stored file which produced this worksheet. Take a minute and examine this table.

Now, you probably noticed that their were two types of statements on each line of the stored file: those that began with a greater than sign (>) and those that began with a slash sign (/). Those of you who have worked with MagiCalc probably recognized most of the lines which began with a slash—they were simply MagiCalc commands (e.g., /GOC is the command Global Order Column, /GRA indicates Global Recalculation Automatic, etc.). Those lines which began with a greater than sign simply indicated the cell location and the contents of the cell (e.g., cell >A1 stores the label JEFF while cell >A5 stores the label TOTAL; cell >B1 stores the value 60 while cell >B5 stores the function @SUM(B1...B4)). This file, therefore,

TABLE 1 BASIC DATA ENTRY

	A	B
1	JEFF	60
2	LINDA	60
3	JULI	25
4	KEN	25
5	TOTAL	170

MAGICALC EXPRESSIONS INCLUDE:

```
>B5:@SUM(B1...B4)
>A5:"TOTAL
>B4:25
>A4:"KEN
>B3:25
>A3:"JULI
>B2:60
>A2:"LINDA
>B1:60
>A1:"JEFF
/W1
/GOC
/GRA
/GC7
/X-/X>A1:>A1:
```

TABLE 2a MAGICALC MACRO

	A	B	C	D	E	F	COLUMN F STORES EXPRESSION
1		JEFF'S	=	>B1:		0	+C1
2		LINDA'S	=	>B2:		0	+C2
3		JULI'S	=	>B3:		0	+C3
4		KEN'S	=	>B4:		0	+C4

is simply a listing of the default commands (e.g., automatic recalculation, column width of seven, etc.) and the values of each referenced cell (e.g., labels, values, and functions).

(You may find it interesting to load your favorite worksheet and examine it with any standard word processor. Since MagiCalc files are simple and standard text files, just load this worksheet and examine it using your word processing software. Alternately, if you don't use a word processing package but do have a favorite spreadsheet, simply use the PRINT IN SAVE FORMAT option to get a complete listing of commands and stored cell values, labels and functions.)

You may be wondering what is the use of this information. Just bear with me a while longer. Now, since we know the structure (cell references preceded with > and commands preceded with /) of a MagiCalc file, we can use this knowledge to create a simple macro. Let's say that we wish to frequently replace the values stored in column B of this worksheet. We could use our new knowledge of MagiCalc worksheet files and create a simple macro. Here we shall use MagiCalc to create our macro,

TABLE 2b MAGICALC MACRO

	A	B		C	D	E	F
1		JEFF'S	=	63	>B1:		63
2		LINDA'S	=	63	>B2:		63
3		JULI'S	=	26.25	>B3:		26.25
4		KEN'S	=	26.25	>B4:		26.26

When saved as a PRINT SOFTCOPY, save only cells E1 through F4. Your file will then include, assuming that you have entered values in column C:

```
>B1:    63
>B2:    63
>B3: 26.25
>B4: 26.25
```

Then, after loading the worksheet from Table 1, go back to your FILE SUBSYSTEM, and LOAD your softcopy. MagiCalc will warn you that you may destroy your file. Ignore the warning and complete the loading. Now check your worksheet and see the changes.

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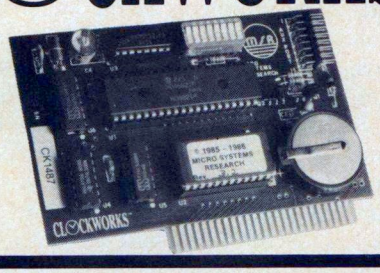

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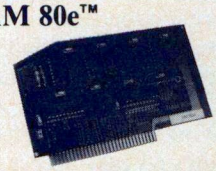

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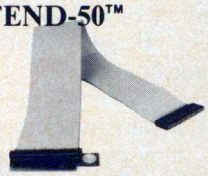

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although such a macro could just as easily be created with your favorite word processor. The structure of the spreadsheet used to create this macro is listed in Table 2a while a worked example is listed in Table 2b. Take a moment and look at these tables.

What you no doubt see is a simple listing of the labels and the need to enter the values for each person in column C. Column F uses a list of references to column C so that the values will be listed immediately after their cell labels which were listed in column E. (Column E was created with a series of label commands, using the quote option to enter the label (e.g., ">B1:) .)

Once all the new values are entered, see Table 2b, just PRINT this table to disk, using the PRINT SUBSYSTEM and the PRINT SOFTCOPY options, making sure that E1 is the beginning cell and F4 was the ending cell. You have now created your macro when you assign it a file name. (You might wish to use the standard of .XQT as a suffix of any macro file (e.g., ALLOW.XQT). This will help identify which files are worksheet files and which are macros at a later date.)

Here's your chance to test your macro. Go to your worksheet area and load the original worksheet, the one that resembled Table 1. Now, return to your FILE SUBSYSTEM and load your macro file. Ignore the warning about the possibility of overlaying or distroying your worksheet and load your macro. When you return to your worksheet area, you will see the new values automatically entered into your worksheet in column B.

Now, let's say that you are interested in converting this simple idea to work with a more complex task. For example, if you pull out last December's *Call - A.P.P.L.E* article on tax templates you will recall a rather complex worksheet. Since this template was designed about FORM 1040, Schedule A and Schedule B, it is not surprising that the worksheet area spanned hundreds of cells. You were expected to enter values in what must have appeared as a haphazard design—columns and rows from A1 through AL55.

Now consider the worked example in Table 2b. You might use Columns A and B for a straightforward listing of labels of the important information, column C for data entry, Column E for cell reference to the template and column F to reference the values entered in the macro template. You could then PRINT the appropriate part of this macro file to disk, LOAD your template and then LOAD your macro. All VALUES* would find their correct cell location, even though they spanned the entire worksheet. Just press the recalculation key and print the final results.

Now, think of the potential. If you are working with many clients, just save a copy of the macro file for each client. Then load your template, load your macro, press ! to recalculate all cell values, and then print the final results. I think you now see one important application of macros.

By the way, since you will PRINT only the macro part of the file to disk each time, you can save enormous amounts of disk space. This is especially true when your template is large and complex. This is a nice bonus when you use macros and an Apple II standard disk drive!

AppleWorks Macros with MacroWorks

Our second example involves the repetitive task of formatting a standard worksheet. Indeed, you have probably experienced the same frustration as I when it comes to formatting—it's a task that is dull and repetitive. Actually, now that I think about it, these are two good criteria for deciding when to build a macro. If the task is dull and repetitive, then it's time to build a macro!

Since we wish to use the AppleWorks spreadsheet module which allows no easy access to building macros, we shall use MacroWorks. It is an add-on product from Beagle Brothers. This software will enable you to add some useful macros to Apple's best selling Apple II integrated package. Because MacroWorks is an add- on package to AppleWorks, MacroWorks is directly dependent upon AppleWorks and MacroWorks can use only standard AppleWorks commands as part of its macro. As Beagle Brother's documentation noted:

- Macros will only save you keystrokes; they cannot do anything "illegal" that AppleWorks won't already do.
- Every macro is simply a series of normal AppleWorks keystrokes (pg. 6).

In our macro application, this is not an important limitation. So, if you use AppleWorks, read on... Even if you don't, you'll find the application and approach interesting.

But, before we demonstrate the macro, it is important to note that MacroWorks enables three types of macros:

1. those supplied by the author, Randy Brandt;
2. those custom macros you supply and wish to use in any one unique work session and
3. those custom macros you make part of the AppleWorks start-up procedure.

The first option is most straightforward. MacroWorks adds a great variety of useful commands to AppleWorks. Most of these commands were designed to work with AppleWorks' wordprocessing, however. (If you are a confirmed AppleWorks wordprocessing user, then the $39.95 MacroWorks' package is well worth the money.) Some of these standard MacroWorks' commands also apply to the spreadsheet module of AppleWorks. These include:

solid-apple-Tab	jump 26 items to the right(e.g., go from column A to column AA)
solid-apple-D	delete the current row
solid-apple-F	clear previous search criteria and now search for new word
solid-apple-Z	zap to end of file

While some of you may find these enhancements useful, MacroWorks does not begin to shine until you use the second option—temporarily stored keystroke sequences which can be accessed by pressing solid-apple comma or solid-apple period keys. Of course, before you can execute one or both of these commands, you first have to build the macro. You build the macro by doing the following:

1. press open-apple-X,
2. Press either the comma key or the period key--thus indicating the access macro key you wish to use,
3. Enter the key sequence you wish to store (up to 20 keystrokes),
4. Press control-@ to indicate that you have finished entering your macro.

Now, you can press either of the two appropriate keys—either closed-apple comma or closed-apple period—when you wish to execute the macro. Of course, since this a temporary macro and RAM resident, this macro will last until you turn your computer off or boot other software. But while you have your AppleWorks running, often used macros

TABLE 3

```
        REVIEW/ADD/CHANGE              Escape: Main Menu
===============A=====B====C====D====E=====F====G====H====
    1:FIRST CLASS
    2:=========================================================
    3:NAME          QZ-1 QZ-2  TEST--1     QZ-3    TEST--2    QZ-4TEST--3
    4:-------------------------------------------------------------------------
    5:Student #1
    6:Student #2
    7:Student #3
    8:Student #4
    9:Student #5
    10:Student #6
    11:Student #7
    12:Student #8
    13:Student #9
    14:Student #10
    15:-------------------------------------------------------------------
    16:Summary Stats
    17:Count
    18:Average
-------------------------------------------------------------------------------
A1: (Label) FIRST CLASS
Type entry or use @ or cmds                              @-? for Help
```

can save a considerable amount of time and energy.

Here's one formatting application. Let's assume that you are a public school teacher. You teach five sections of the same class. You know that you will need to modify AppleWorks' standard column width of 9 characters to varied column widths in contiguous columns. Furthermore, you know that you shall wish to copy repeating labels from one cell to the remaining cells in the same row.

Rather than setting up a template, you can create the macro, store it in one of these two temporary locations, and easily retrieve it. Here's how to convert a column width of 9 characters to a column width of 4 characters—a task which will normally require a nine character sequence to a single keystroke.

1. Place the marker in column B
2. Enter open-apple X . (period)
   (store keystrokes in macro solid-apple period)
3. Enter open-apple L(ayout) C(olumn) RETURN C(olumn width) open-apple <- open-apple <- open-apple <- open-apple <- RETURN
   (enter normal reformatting commands)
4. Enter CNTRL-@
   (close macro command)

Now, not only did you reformat column B, but you stored all these keystrokes into RAM. Then this command sequence can be accessed by a simple press of the closed-apple period command. You can move the marker to column C, E, or G, then enter closed-apple period and watch MacroWorks automaticly modify AppleWorks' column width format in each of these columns. See Table 3.

Now, we can develop a second macro which will copy the repeating label stored in column A to the remaining columns (B through H). Here's how:

1. Enter open-apple X,
   (comma)
   (store keystrokes in macro solid-apple comma)
2. Enter open-apple C(opy) W(ithin worksheet) RETURN
   -> .(period) -> -> ->
   ->-> -> RETURN
   (enter command sequence)
3. Enter CNTRL-@(close macro command)

Now, when you enter a repeating label (e.g., ========, --------,etc.) in column A, you can easily transfer it to column B through H with a press of solid-apple comma. Thus you can accomplish in a single keystroke what would normally take 10 keystrokes. Pretty easy, pretty neat.

Of course, choosing this option will eliminate your macro when you log off or change software. If you wish to maintain these macros—and add several others—from one session to the next,

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		Gamma 1/2 height IIc	144

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then you will have to choose Macro-Works third option: modifying Macro-Works' AppleWorks start-up diskettes. Actually, such modifications are quite simple.

Table 4 lists modifications of normal MacroWorks that I found useful. For example, I took several of THE Spreadsheet and SuperCalc3a keystrokes and entered them into AppleWorks (e.g., solid-apple B: to blank the current cell; solid-apple E: to edit or update the current cell; solid-apple R: to begin a replicating procedure; solid-apple H: move the cursor to cell A1, the home position). Other added macros include formatting macros, (e.g., solid-apple-I: insert a blank line), sorting macros (e.g., solid-apple ctrl-A and solid-apple ctrl-N), and repetitive data entry macro (e.g., solid-apple N:my name and address). (Note, a number of what I found to be the most useful wordprocessing commands were left intact (e.g., solid-apple S to save and remove a file, etc.). (By the way, I left you 38 bytes for your own Macros.)

The steps used to produced these macros were straight forward. All I did was:

1. enter AppleWork's word processing module,
2. load a copy of the current MACROS file,
3. edited it to my needs,
4. recompiled the MACROS file,
5. saving it to the appropriate disk, and
6. load my modified Macro-Works' AppleWorks. All in all, the steps are not difficult and can save you considerable time and energy.

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What the Future Brings

In this third article in our series, Upgrading Your Spreadsheet, we have explored the basis of macro building. Next time we shall use SuperCalc3a to complete our discussion of macros. You say that you don't use SuperCalc3a. Well, after reading next month's article you may. We will see.

AUTHOR'S NOTE: The format suggested in Table 3.2a will work directly only with MagiCalc VALUES—labels stored in referenced cells transfer as zero. You may wish to enter your unique LABELS (e.g., client name and address, etc.) directly into column F or modify the suggested macro format to better fit your needs. In any case, make sure that you enter the cell reference and the appropriate VALUES or LABELS.

TABLE 4 MacroWorks' AppleWorks Macros for Spreadsheet Module

Macro	Comment
START	
<left>:<oa-tab><oa-tab><sa-left>@	jump to beginning of line
<right>:<sa-left><down><left>@	jump to end of line
<down>:<oa-F>ONP<rtn>@	find next forced page break (NP)
<rtn>:<sa-left><down>@	move to column A and down one row
p0PA:<esc><rtn><rtn>@	add files to desktop
<ctrl-A>:<oa-A><oa-9><rtn><rtn>@	alphabetical spreadsheet column sort
B:<oa-B>E@	blank current cell
C:<oa-C>W<rtn>.<right><right><right>	copy repeating label to next
<right><right><rtn>@	5 columns
<cntrl-D>:<oa-D>R@	delete current row
E:<oa-U>@	edit in current cell
F:<oa-F>T<oa-Y>@	find text, clear previous word
H:<oa-F><oa-Y>CA1<rtn>@	home to top left of spreadsheet
<cntrl-I>:<oa-I>R1<rtn>@	insert one row at marker position
K:<oa-K><rtn><oa-F>P@	calculate page breaks; find a page
L:<oa-L>C<rtn>C<oa-right><oa-right><rtn>@	set column width to 11 characters
N:Jeffrey M. Jacques<rtn><down>"	store name and address & goto
1008 Mimosa Drive"<rtn><down>"	column A
(904) 385-7947<rtn>@	
<ctrl-N>:<oa-A><oa-9><rtn>3<rtn>@	numerical spreadsheet column sort
P:<oa-P><rtn><rtn><rtn>@	print current file
Q:<oa-Q><down><rtn>@	switch to next file on desktop
R:<oa-C>W@	replicate within worksheet
S:<oa-S><esc>4<rtn><rtn><oa-Q><rtn>@	save and remove a file
Y:<oa-D>R<rtn><oa-I>R1@	blank current entry row
p0PZ:<oa-M>T<oa-9><rtn><left>@	delete (zap) to end of file
END	

NOTES

---

209 of 216 bytes used

System Macros (can't be recompiled)

<del>:<right><del>@	oa-del works the same as sa-del
D:<oa-M>T<oa-right><left><rtn>@	delete the word under the cursor
U:<oa-C>F@	undo last MacroWorks delete
:<spc><spc><spc><spc><down><left><left><left><left>@	insert 4 spaces
,:<right><right><right><right><del><del><del><del><down>@	delete 4 spaces

Comma & period are redefinable from within AppleWorks; 20 keystrokes each.

The Graphics Toolkit: Part 9

Randi Rost

Welcome to Part 9 of this series on machine language graphics for the Apple II. In past installments, we laid the groundwork for doing sophisticated high-resolution graphics and examined routines to clear the screen, draw lines, perform color complements, and create and animate block shapes. Last time we figured out how to do extremely smooth animation using double-buffering.

In this, the last installment of the series, we'll look at another type of block shape. By a little careful coding, we'll be able to utilize some of the code that was developed to support block-shape animation. We'll make some changes to the shape table generation program we looked at in Part 5 to aid in the creation of this new type of shape.

Non-Animation Shape Tables

So far we have developed support for block shapes that were intended to be moved around quite rapidly on the screen. We discovered that the quirks of the Apple's graphics architecture forced us to develop rather lengthy shape tables, with seven frames per shape, to facilitate smooth animation.

Yet, it seems that there exists a large class of shapes that will remain relatively static. One good example is text. Sometimes letters are required to present information (such as a game score). It's not necessary to move these letters smoothly around the screen, so including them in an animation shape table (with seven frames per shape) would be a waste of space. The answer for such "non-animation shapes" is a block shape table that has just one frame per shape. Each shape will be required to start on a byte boundary on the hi-res graphics screen.

Creating Non-Animation Shapes

If you dig out the MAT (Make Animation Tables) program from Part 5, we'll make some modifications to it so that it can be used to create non-animation shapes.

Listing 1 shows the changes you need to make to your version of the MAT program to create a program to make non-animation shape tables. After loading in the MAT program replace lines 186 and 210 with the lines shown. (This fixes a bug in the MAT program that caused screen memory addresses to be calculated incorrectly for the bottom two-thirds of the screen.) Save the modified program back onto disk as MAT. Then delete lines 90, 540, 1025, 5000, 5010-5300, and 8080-8400. After typing in the remainder of the lines shown in Listing 1, save the program to disk as M-NAT, for Make Non-Animation Tables.

When you run this program, the first four options will function the same as for MAT. You can load in a hi-res screen, adjust the cursor positions, save the table, or generate a single, non-animation block shape. Since these shapes are not shifted at all, there is no need to leave two bytes of space to the right of each shape. The block defined by the cursor is exactly the block that will make up the shape. As in the other

program, position the brackets to the top and bottom lines that you want to appear in the shape.

Option #5 allows you to define a bunch of shapes at once. For instance, you can use the DOS Toolkit to draw the letters A-Z on the hi-res screen in a special font. Then use option #5 after positioning the brackets at the upper left of the 'A' and the lower right of the 'Z'. You'll have to specify that the first shape will be shape #65 and that each shape is seven pixels wide. Easy as pie, you have defined shapes 65-90 of your shape table!

A Sample Shape Table

Take a look at Listing 2. This is a hex dump of a non-animation shape table that contains definitions for the letters A-I.

The first two bytes of the shape table again provide an offset to the first byte beyond the end of the current shape table (in case we later choose to add more shapes to the table.) The third byte indicates the maximum number of shapes in the shape table. In this case there can be up to 73 ($49) shapes in the table. (Also recall that for animation shape tables, the high bit of this byte was set (1). In this case, it's not set (0). This can be used to identify which shape tables are animation shape tables and which are non-animation.)

Following this, we again have two-byte offsets for each of the 73 shapes allowed in the shape table. Only shapes 65-73 have been defined for this shape table. Shape #65 is 'A', and the offset is 18 ($12). Adding this to the address of the offset gives us the pointer to the data for the 'A' shape. The address of the offset ($6083) plus the offset itself ($12) gives us a pointer to the shape data ($6095).

The shape data for the letter 'A' begins with the width of the shape in bytes (at $6095), the height of the shape in pixels ($6096), followed by the shape data ($6097-$609D). As you can see, non-animation shape tables are a little more straightforward than animation tables! We have defined each of our letter shapes with its shape number equal to its ASCII value for good reason, as we'll soon see.

If you want, you can type in the hex dump of Listing 2, and type BSAVE LETTER SHAPES, A$6000, L$E8 to save it to disk. Otherwise, take a short timeout now and create your own shape table of letters to use with this month's demo program.

LISTING 1

```
 90    REM MAKE NON-ANIMATION TABLES
186    T3 = T0 -  INT (T0 / 8) * 8
210    Y(I) = 8192 + T1 * 1024 + T3 * 128 + T2 * 40
540    POKE START + 2,NUM
1025   PRINT "5) GENERATE SEVERAL SHAPES AT ONCE"
5000   REM  *****  GENERATE SEVERAL SHAPES  *****
5010   INPUT "WHAT NUMBER SHAPE WILL THE FIRST BE?";TS
5015   HOME : VTAB 22
5020   PRINT "WIDTH OF SHAPES IN PIXELS (MUST BE A": INPUT
       "MULTIPLE OF 7)?";WIDTH
5030   WIDTH =  INT ((WIDTH - 1) / 7) + 1
5040   T3 =  INT ((X2 - X1) / (WIDTH * 7))
5050   FOR T4 = TS TO TS + T3
5060   SN = T4
5070   A1 = START + SN * 2 + 1
5080   T1 =  PEEK (A1):T2 =  PEEK (A1 + 1)
5090   IF T1 = 0 AND T2 = 0 THEN 5110
5100   PRINT "SHAPE #";SN;" ALREADY DEFINED...": GOTO 5150
5110   T = AVAIL - A1
5120   POKE A1,T -  INT (T / 256) * 256: POKE A1 + 1, INT (T / 256)
5130   POKE AVAIL,WIDTH
5140   GOSUB 10000
5150   X1 = X1 + WIDTH * 7
5160   NEXT T4
5170   RETURN
8080   WIDTH =  INT ((X2 - X1) / 7) + 1: POKE AVAIL,WIDTH
8090   GOSUB 10000
8100   RETURN
10000  HEIGHT = Y2 - Y1 + 1: POKE AVAIL + 1,HEIGHT
10010  AVAIL = AVAIL + 2
10020  FOR I = Y1 TO Y1 + HEIGHT - 1
10030  FOR J =  INT (X1 / 7) TO  INT (X1 / 7) + WIDTH - 1
10040  T =  PEEK (Y(I) + J)
10050  POKE AVAIL,T
10060  AVAIL = AVAIL + 1
10070  NEXT J,I
10080  RETURN
```

New Routines

What a bonus! This month you lucky guys and gals get three new graphics routines to add to your collection! The first two routines draw non-animation shapes in much the same way that DRAW and XDRAW allow you to draw animation shapes. The BLKDRAW entry point allows you to overwrite the background with the non-animation shape data, and the BLKXDRAW entry point allows you to exclusive-or the shape data with the background.

The BLKDRAW/BLKXDRAW routine is pretty simple. Lines 40-58 (Listing 3) compute a pointer to the shape data from the shape number, the start of the shape table, and the offset for the desired shape. The WIDTH and HEIGHT parameters are read from the shape data and stored into locations for later use. The starting byte within the row is computed and stored in XBYTE. By jumping to DRAWSHP in the DRAW/ XDRAW routine (didja wonder what that unreferenced label was for?)

LISTING 2

```
6000.60E7
6000- E6 00 49 00 00 00 00 00
6008- 00 00 00 00 00 00 00 00
6010- 00 00 00 00 00 00 00 00
6018- 00 00 00 00 00 00 00 00
6020- 00 00 00 00 00 00 00 00
6028- 00 00 00 00 00 00 00 00
6030- 00 00 00 00 00 00 00 00
6038- 00 00 00 00 00 00 00 00
6040- 00 00 00 00 00 00 00 00
6048- 00 00 00 00 00 00 00 00
6050- 00 00 00 00 00 00 00 00
6058- 00 00 00 00 00 00 00 00
6060- 00 00 00 00 00 00 00 00
6068- 00 00 00 00 00 00 00 00
6070- 00 00 00 00 00 00 00 00
6078- 00 00 00 00 00 00 00 00
6080- 00 00 00 12 00 19 00 20
6088- 00 27 00 2E 00 35 00 3C
6090- 00 43 00 4A 00 01 07 1E
6098- 3F 33 3F 3F 33 33 01 07
60A0- 1F 3F 33 1F 33 3F 1F 01
60A8- 07 1E 3F 33 03 33 3F 1E
60B0- 01 07 1F 3F 33 33 33 3F
60B8- 1F 01 07 3F 3F 03 1F 03
60C0- 3F 3F 01 07 3F 3F 03 1F
60C8- 1F 03 03 01 07 1E 3F 03
60D0- 3B 33 3F 1E 01 07 33 33
60D8- 33 3F 3F 33 33 01 07 3F
60E0- 3F 0C OC OC 3F 3F 00 00
```

we can draw our shape!

The PRNTMSG routine is useful for a particular type of non-animation shape table: character sets. PRNTMSG expects to have a pointer to a character string passed in A and X, width of characters in pixels passed in Y, and the location on the screen at which to begin drawing in $06-$08. The last character of the string should have its high bit set so PRNTMSG knows when it's reached the end of the string.

Lines 110-121 of Listing 3 define a simple loop which goes through the string a character at a time and calls PDRAW (which just calls BLKDRAW) for each character in the string. Interestingly enough (you knew this was coming, right?), if our shape table has letters whose shape number corresponds to their ASCII value, we can quickly buzz through the string and pass the letter's ASCII value as the shape number to BLKDRAW. The last character is treated a little differently, since it is necessary to clear the high bit to arrive at a valid shape number.

These routines are actually a lot more flexible than I've indicated thus far. The main limitation is that shapes drawn by these routines must be drawn on a byte boundary. However, that doesn't prevent you from doing your own shifting to define several shapes (some shifted) to use in an animation sequence. Some objects, such as missiles, might need to move as rapidly as seven pixels per jump. If that's the case, they can be designed as "non-animation" shapes. This type of shape also works as well as animation shapes for objects that only move vertically (why?) and it takes up just 1/7 the space. I also suspect some very interesting and powerful "character shape" animation can be done using the PRNTMSG routine. Of course, the shapes need not even be characters! Let your imagination loose and see what kind of creative things you can do with these routines.

For Example...

This month's demo program (Listing 4) is fairly short. I just wanted to give you an idea of how easy it is to print messages on the screen with your character set font and an assembler. The DCI string directive will define the bytes of data to represent a string with the high bit of the last byte automatically set. Then it's a simple matter to load up the arguments to indicate the string placement and call the PRNTMSG routine and display the strings on the hi-res screen.

LISTING 3

```
1  *
2  * THE BLOCK SHAPE DRAW ROUTINES WILL DRAW
3  * THE SHAPE NUMBER CONTAINED IN $09 AT
4  * COORDINATES X,Y ON THE HI-RES SCREEN.
5  * Y SHOULD BE PASSED IN THE Y REGISTER, XHI IN
6  * IN A AND XLO IN X.
7  *
8                ORG    $0DB7
9  XLOCLO        EQU    $06
10 XLOCHI        EQU    $07
11 YLOC          EQU    $08
12 SHPNO         EQU    $09
13 BLKTABL       EQU    $E8
14 SEQBASL       EQU    $D4
15 SEQBASH       EQU    $D5
16 XDIVTBL       EQU    $4C
17 TEMPPTR2      EQU    $D2
18 XBYTE         EQU    $0AFE
19 HEIGHT        EQU    $0B00
20 WIDTH         EQU    $0B01
21 STOREREG      EQU    $0B05
22 DEORLOC       EQU    $0C44
23 DEORLOC2      EQU    $0D8C
24 DRAWSHP       EQU    $0C1A
25 TEMPCNT       DS     1
26 BLKDRW        JSR    STOREREG      ;SAVE REGISTERS
                                      FOR LATER USE
27               LDA    #$EA
28               STA    DEORLOC       ;STORE NOPS IF
29               STA    DEORLOC+1     ;DRAW ENTRY PT USED
30               STA    DEORLOC2
31               STA    DEORLOC2+1
32               BMI    DBLKST
33 BLKXDRW       JSR    STOREREG
34               LDA    #$51
35               STA    DEORLOC       ;STORE EOR IF
                                      XDRAW
36               STA    DEORLOC2      ;ENTRY PT IS USED
37               LDA    #$1E
38               STA    DEORLOC+1
39               STA    DEORLOC2+1
40 DBLKST        LDA    SHPNO         ;LOAD SHAPE #
41               ASL                  ;MULTIPLY BY 2
42               TAY                  ;STORE RESULT IN Y
43               INY                  ;ADD 1
44               TYA
45               CLC
46               ADC    (BLKTABL),Y   ;ADD OFFSET FOR SHAPE
47               STA    SEQBASL       ;STORE RESULTING PTR
                                      TO SHAPE
48               INY
49               LDA    (BLKTABL),Y   ;COMPUTE HI BYTE OF
                                      SHAPE PTR
50               ADC    BLKTABL+1
51               STA    SEQBASH       ;...AND STORE THE
                                      RESULT
52               CLC
53               LDA    SEQBASL
54               ADC    BLKTABL       ;ADD SHAPE OFFSET TO
55               STA    SEQBASL       ;STARTING ADDRESS OF
                                      SHAPE
56               LDA    #$00          ;TABLE TO GET FINAL
57               ADC    SEQBASH       ;POINTER TO SHAPE
58               STA    SEQBASH
59               LDY    #$00
60               LDA    (SEQBASL),Y   ;GET SHAPE WIDTH
                                      FROM TABLE
61               STA    WIDTH
62               NY
63               LDA    (SEQBASL),Y
64               STA    HEIGHT        ;GET SHAPE HEIGHT
                                      FROM TABLE
65               CLC
66               LDA    SEQBASL
67               ADC    #$02          ;INCREMENT PTRS TO
68               STA    SEQBASL       ;POINT AT START
69               LDA    #$00          ;OF SHAPE TO BE
                                      DRAWN
```

To use this program, type it in as shown and save it to disk. Then BLOAD all the routines we've developed in Parts 1-8, plus the routine in Listing 3. BLOAD your character set table (or the one in Listing 2) at $8700. Then BRUN the demo program. You should see the strings "ABCDEFGHI", "DEADHEAD", and "IHGFEDCBA" drawn about in the center of the screen.

The Last Word

With this installment, the Graphics Toolkit series draws to a close. I've shared with you an entire collection of powerful machine language routines that you can put to work for you. Hopefully along the way I've taught you a little more about general graphics concepts, the Apple II's graphics architecture, assembly language programming, and software engineering in general. You should be able to do some pretty nifty things with all the flexible and efficient routines provided in this series. Best of all, you should have learned enough to develop your own routines to provide additional functionality. Hope you've all enjoyed it! I sure have. Happy Gaming!

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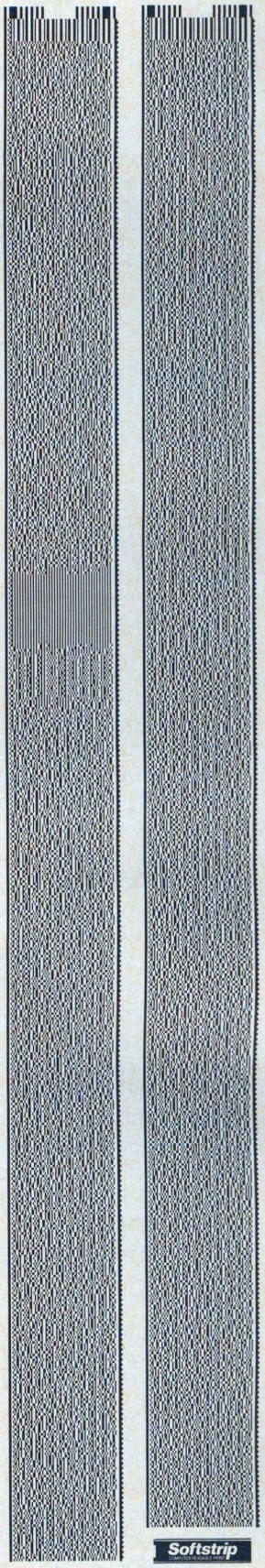
CIRCLE 15 ON READER SERVICE CARD

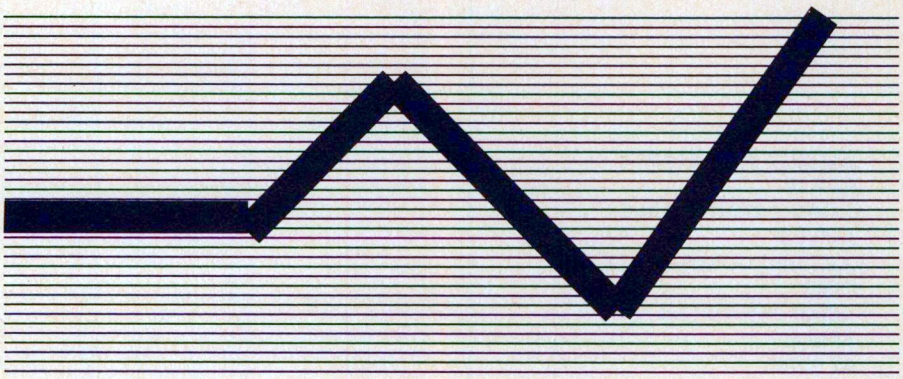

```
70                ADC   SEQBASH
71                STA   SEQBASH
72                LDA   XDIVTBL
73                STA   TEMPPTR2          ;GET PTRS TO X/7 TABLE
74                LDA   XDIVTBL+1
75                STA   TEMPPTR2+1
76                LDA   XLOCHI            ;IF X>255
77                BEQ   LT256A7           ;INCREMENT TEMPPTR
78                INC   TEMPPTR2+1
79  LT256A7       LDY   XLOCLO
80                LDA   (TEMPPTR2),Y
81                STA   XBYTE
82                JMP   DRAWSHP           ;DRAW THE SHAPE
83  *
84  *PRNTMSG CAN BE USED TO DISPLAY A MESSAGE USING THE
85  *NON-ANIMATION (CHARACTER SET) SHAPE TABLE
86  *CURRENTLY  IN MEMORY.  THE ADDRESS OF THE MESSAGE
87  *SHOULD BE PASSED WITH HI BYTE IN A AND LO BYTE IN X.
88  *THE MESSAGE SHOULD BE A SERIES OF CHARACTER
89  *BYTESWITH HI BIT OFF, EXCEPT FOR THE LAST CHARACTER
90  *BYTE, WHICH SHOULD HAVE THE HI BIT SET. THE WIDTH O
91  *THE SHAPES IN PIXELS SHOULD BE PASSED IN THE Y
92  *REGISTER.  THE COORDINATE OF THE UPPER LEFT CORNER
93  *OF THE MESSAGE SHOULD BE PASSED IN THE LOCATIONS
94  $06-$08 WITH $06=XLO, $07=XHI, $08=Y.
95  MSGPTR        EQU   $FC
96  PTMPX         DS    2
97  PTMPY         DS    1
98  PWIDTH        DS    1
99  PRNTMSG       STA   MSGPTR+1
100               STX   MSGPTR            ;STORE PTR TO
                                          MESSAGE
101               STY   PWIDTH            ;STORE WIDTH OF
                                          CHARS
102               LDA   XLOCLO
103               STA   PTMPX
104               LDA   XLOCHI
105               STA   PTMPX+1           ;STORE COORDIN-
                                          ATES
106               LDA   YLOC              ;OF UPPER LEFT
                                          CORNER
107               STA   PTMPY             ;WHERE MSG
                                          WILL BE
108               LDY   #$00
109               STY   TEMPCNT           ;ZERO Y INDEX
                                          VALUE
110 PLOOP         LDY   TEMPCNT
111               LDA   (MSGPTR),Y        ;LOAD NEXT
                                          CHAR OF
                                          MSG
112               BMI   PDONE             ;IF MSB SET,
                                          T'S LAST CHAR
113               JSR   PDRAW             ;ELSE DRAW
                                          CHAR
114               CLC
115               LDA   PTMPX             ;ADD WIDTH TO
                                          XPOS TO GET
                                          NEXT X
116               ADC   PWIDTH
117               STA   PTMPX
118               BCC   PNOCAR
119               INC   TMPX+1
120 PNOCAR        INC   TEMPCNT
121               BNE   PLOOP             ;GO BACK FOR
                                          MORE CHARS
122 PDONE         AND   #$7F              ;MASK OUT MSB
                                          OF BYTE
123               JSR   PDRAW             ;DRAW THE LAST
                                          CHAR
124               RTS
125 PDRAW         STA   SHPNO             ;ROUTINE TO
126               LDA   PTMPX+1           ;LOAD X-Y
                                          COORDINATES
127               LDX   PTMPX
128               LDY   PTMPY
129               JSR   BLKDRW            ;JUMP TO BLOCK
                                          DRAW ROUTINE
130               RTS
```

LISTING 4

```
1   *
2   *LISTING 4
3   *FUNCTION: TEST PRINT MESSAGE ROUTINE
4   *AUTHOR: RANDI J. ROST
5   *
6   *
7   *
8               ORG     $6000
9   INIT        EQU     $803
10  PRNTMSG     EQU     $E33
11  HGR         EQU     $865
12  XLOCLO      EQU     $06
13  XLOCHI      EQU     $07
14  YLOC        EQU     $08
15  BLKTABL     EQU     $E8
16  DEMO9       LDA     #$1B        ;LOAD A WITH YTABLE
                                    ADR HI
17              LDX     #$00        ;LOAD X WITH YTABLE
                                    ADR LO
18              JSR     INIT        ;SET UP LOOKUP TABLE
                                    PTRS
19              LDA     #$00        ;LOAD PTR TO SHAPE
                                    TABLE
                                    AT $8700
20              STA     BLKTABL
21              LDA     #$87
22              STA     BLKTABL+1
23              JSR     HGR         ;ENABLE HI-RES
                                    GRAPHICS
                                    PAGE #1
24              LDA     #$40        ;DISPLAY MESSAGE 1
                                    AT (64,64)
25              STA     XLOCLO
26              STA     YLDC
27              LDA     #$00
28              STA     XLOCHI
29              LDA     #>MSG1      ;LOAD POINTER TO
                                    MSG1
30              LDX     #<MSG1
31              LDY     #$07        ;LOAD WIDTH OF CHARS
                                    IN PIXELS
32              JSR     PRNTMSG     ;PRINT THE MESSAGE
33              LDA     #$50        ;PRINT MSGK2 AT
                                    (80,80)
34              STA     XLOCLO
35              STA     YLOC
36              LDA     #$00
37              STA     XLOCHI
38              LDA     #>MSG2      ;LOAD POINTER TO
                                    MSG2
39              LDX#    <MSG2
40              LDY     #$07        ;LOAD WIDTH OF CHARS
                                    IN
                                    PIXELS
41              JSR     PRNTMSG     ;PRINT MESSAGE #2
42              LDA     #$60        ;PRINT MSG3 AT(96,96)
43              STA     XLOCLO
44              STA     YLOC
45              LDA     #$00
46              STA     XLOCHI
47              LDA     #>MSG3      ;LOAD POINTER TO
                                    MSG3
48              LDX     #<MSG3
49              LDY     #$07        ;LOAD WIDTH OF CHARS
                                    IN PIXELS
50              JSR     PRNTMSG     ;PRINT MESSAGE #3
51              RTS
52  MSG1        DCI     'ABCDEFGHI'
53  MSG2        DCI     'DEADHEAD'
54  MSG3        DCI     'IHGFEDCBA'
```



A.P.P.L.E. Doctor



Bruce F. Field

THE ENVOY BOARD

About six months ago I mentioned that Vertex Systems, Inc. in Los Angeles produced the "Turnover" DOS controller board for the IBM PC that allowed the PC to read and write diskettes in Apple DOS format. Between the time I researched the item and it appeared in print the company apparently went out of business.

However, would I mention this again if I didn't have another solution? Dean Houser, VP of operations, at ASKY, Inc. called me to announce the availability of their new product the "Envoy" board which will sell for $180. This is a disk controller card that plugs into any slot in the Apple and up to four IBM type or other non-Apple disk drives can be plugged into the Envoy controller. It comes with software to convert ProDOS and DOS 3.3 files and save them in MS-DOS (IBM) format.

The board supports different types of drives, 48 TPI and 96 TPI 5-1/4" drives and 135 TPI 3-1/2" drives. The one disadvantage of this solution is, if you want to convert Apple stuff to IBM, then you must purchase an IBM compatible drive to connect to your Apple. But you can use the extra drive(s) directly with CP/M for additional storage of up to 3.2 Mbytes with 4 drives. ASKY doesn't sell the additional drives, but they are available from other vendors for about $150. The Envoy board comes with a one year warranty. *ASKY, Inc.* can be reached on toll free numbers nationwide at 800-621-0854 or from touch tone phones at 800-228-5136 (at the dial tone press) * 1 5, and from California at 800-634-8245 (at the dial tone press) * 1 5, or in the 408 area code, 247-5742. If all that is confusing their address is *4320 Stevens Creek Blvd., Suite 287, San Jose, CA 95129.*

CHANGE THE DEFAULT VALUES

Murphy Sewall and Wilton Helm wrote with additional information on setting the IIc serial port. The original question was how to set up the IIc port for an odd-ball printer that required 7 data bits. The problem is that the port settings default to values stored in the auxiliary memory every time you do a PR#1. The solution involves changing the default values. Murphy kindly supplied a program to do this.

```
100  REM SET A, B, C, D HERE
110  AD = 0 : REM FOR PORT 2
     SET AD = 4
120  POKE 49153, 0 : REM
     STOREON
130  POKE 49237,0 : REM
     SELECT AUXILIARY
     MEMORY
140  POKE 1144 + AD, 62 : REM
     7 DATA BITS, 1 STOP BIT,
     9600 BAUD
150  POKE 1145 + AD, 255 : REM
     SPACE PARITY
160  POKE 1146 + AD, 64 : REM
     INSERT CR AFTER LF
170  POKE 1147 + AD, 132 : REM
     INSERT CR AFTER 132
     CHARACTERS
180  POKE 49236,0 : REM
     SELECT MAIN MEMORY
```

If you want to set the port to other settings Murphy suggests first setting the port to the desired values and then running the following program.

```
10  AD = 0 : REM FOR PORT 2
    SET AD = 4
20  POKE 49153,0 : REM
    STOREON
30  POKE 49237,0: REM SELECT
    AUXILIARY MEMORY
40  A = PEEK(1144 + AD)
50  B = PEEK(1145 + AD)
60  C = PEEK(1146 + AD)
70  D = PEEK(1147 + AD)
80  POKE 49236,0 : REM
    SELECT MAIN MEMORY
90  PRINT A, B, C, D
```

Once you have these four values for the setup you desire, modify the first program to POKE the correct values. Murphy adds that the POKE program need only be run once after the IIc is turned on. It will sustain the correct port settings through ctrl-Open Apple-Reset and PR#6 warm boots. Hence, it also works with copy protected programs.

If anyone with a IIc out there (I'm a IIe person myself) would like to pass along values for other settings, I will be more than happy to print them.

A MATTER OF OPINION

Charles McConathy of CMC Computer Systems wrote to take exception to my recent opinion on hard drives. The question was whether the reader should get a 3.5 UniDisk or a hard disk. My opinion was that most hard disks for the Apple don't really have a convenient method for making backup copies (the B-Sider may be the exception if you have a spare $700 just to be able to make backups) and when a hard disk (or any disk) fails, you will want a backup of it.

Mr. McConathy says, "We developed and market CMC Hard Drives for the Apple II Computer that are compatible with ProDOS and/or DOS 3.3, or with NovoComp Hard Disk Utility ProDOS, DOS 3.3, CP/M, and Pascal partitions. Under ProDOS we furnish ProSEL, a menu selector by Glen Bredon, that has "Backup", "Restore" and "Recover" utilities that are fast and easy to use...

I think this comment (concerning

hard disks failing) scares a lot of people away from hard drives and they keep using boring floppy drives in fear. I myself would hate to go back to loading spreadsheets that take over 1-1/2 minutes. Hard drives are great! Pick one with a good track record and one that uses proven components and expect years of trouble free use with proper care."

I would never deny that if you need quick access to a lot of data, a hard disk is the way to go. But I stand by my original opinion for the average home user. *CMC Computer Systems* can be reached at *1514 East Edinger #H, Santa Ana, CA 92705, phone (714) 835-2462, Compuserve 76011,646.*

EXTRANEOUS CARRIAGE RETURNS

Chris Arndt passed along a suggestion regarding the problem with extraneous carriage returns in files uploaded to an Apple from a Radio Shack Model 100. After uploading files from the "100", every line ended in a carriage return and the reader wanted to know how to get AppleWriter to remove these carriage returns. Chris replies:

"The model 100 text editor works much the same as Apple Writer during text entry, in that it wraps words at the end of each line. As in Apple Writer, carriage returns are only needed to end paragraphs, or for other formatting purposes. However, when using the Telcom program to transfer programs, after pressing the "upload" function key, and answering the "File to upload?" prompt, a "width?" prompt appears. If this is answered with a number (such as 80), the the program will, with word wrap, send up to 80 characters, and at the end of the last word, send a carriage return. This is most likely the source of the unwanted carriage returns.

However, if the "width?" prompt is answered only with a carriage return (no number), then the program will send the text, just as it was entered, with no added carriage returns."

CHANGE PROGRAMS OR SEND NULL CHARACTERS

Q. *I recently upgraded from a II+ to a IIe and am using a Prometheus Pro-Modem 1200 and an Apricorn Serial card. The problem is, now that I am using the modem in my IIe I can't use 1200 baud without loosing characters on my screen. It appears to happen only when the screen routine attempts to scroll the data up one or more lines. I*

LETTERS POLICY

Call -A.P.P.L.E. welcomes letters from its readers on any topic relating to the magazine's content, experiences with hardware and software, A.P.P.L.E. services, current issues in computing, or programming notes. Because of space limitations, not all letters can be selected for publication or printed in their entirety, but we try to present a representative sample of your views. If you would like your address published, please include it next to your signature.

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The quikLoader provides many other benefits. As soon as power is applied, DOS loads automatically from the card. Included with the quikloader are the popular programs FID and COPYA. These programs, as well as any that you add, will show on the catalog screen. The program is selected with a single keypress.

Installation is easy, just plug it into any peripheral slot. It will work on a APPLE][,][+, or //e.

$179.50

DOS 3.3, Integer, Fid, and COPYA are copyrighted programs of APPLE COMPUTER Inc., and are licensed to Southern California Research Group for distribution only with quikLoader.
APPLE and APPLEWORKS are trademarks of APPLE COMPUTER INC.
quikLoader (designed by Jim Sather) is a trademark of S.C.R.G.

PROmGRAMER™

Designed by Bob Brice — Software by Bob Sander-Cederlof

The PROmGRAMER is an inexpensive **EPROM** programmer for the **APPLE**][,][+, and //e computers. The unit plugs into any slot of the computer, and allows programming any standard 5 volt, 27 series **EPROM**. The ZIF socket allows rapid programming, copying, duplication, or modification of **EPROMs**. **$149.50**

SLOT 3 CLOCK™

The **SLOT 3 CLOCK** is designed to plug into slot 3 of the *//e without* interfering with auxillary memory. **PRODOS™** is fully supported, and the card is APPLESOFT™ compatible. Installation software and long-life lithium battery are included. designed by Chuck Shaffer **$79.50**

SWITCH-A-SLOT

The SWITCH-A-SLOT is an expansion chassis, which allows the user to plug in up to four peripheral cards in one slot. One of these cards is selected for use, and *only* that card draws power. **$179.50**

SWITCH-A-SLOT and **EXTEND-A-SLOT** work well with most slow to medium speed cards. They are not recommended for high speed data transfer devices.

EXTEND-A-SLOT

The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. **$34.95**

9-16 Adapter for APPLE //e & //c

This permits the use of most 16-pin I/O devices with the APPLE //e or //c. The only limitations are those devices that use the annunciators or the $C040 strobe. **NOTE:** The //c does not support the use of two joysticks. **$14.95**

16-9 Adapter for APPLE][and][+

With this adapter, owners of early APPLEs can take advantage of the newer 9-pin game products, such as joysticks, **MUPPET LEARNING KEYS™**, etc. **$14.95**

BOOKS BY JIM SATHER

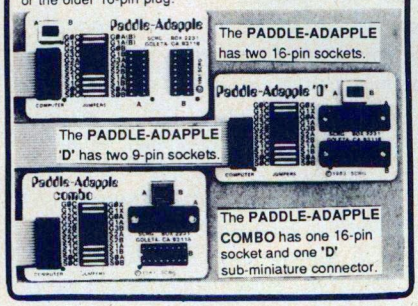
Understanding the APPLE][- The definitive source of information about how the APPLE][works. Forword by Steve Wozniak. **$22.95**

Understanding the APPLE //e - This companion volume covers the additional information needed to know details of the computer hardware. **$24.95**

Paddle-Adapple

The **PADDLE-ADAPPLE** game expansion adapter plugs into the 16-pin interior game I/O socket, and allows you to select between one of two devices, or use two joysticks for games such as **ARCHON™** and **ONE-ON-ONE™**. **$29.95**

There are three versions to adapt to any combination of the newer type APPLE connector (the 9-pin D sub-miniature), or the older 16-pin plug.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Paddle-Adapple COMBO
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Telex 658340-SCRG (Intertel SNC)
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am not having a problem with losing characters when I start at the HOME position and don't force the screen to scroll. Problems arise as soon as it has to scroll. I have temporarily gotten past this problem by setting the serial card to transmit at 300 baud only, but this means that I can't use my modem at 1200 baud.

A. The problem is with the 80-column firmware in the Apple IIe. It simply takes too much time to scroll the screen and characters are lost while this happens. The solution is to use a communications program that doesn't use the Apple firmware, but instead uses it's own, faster, program to write to the screen. ASCII Express Professional is one such program that can be used successfully at 1200 baud. I have been warned, however, that if you have an enhanced IIe you should *not* select the IIe option in the setup menu. Instead select item 0 - automatic, otherwise AE Pro will not work properly with the enhanced IIe.

(Our own Modem Magician works fine at 1200 baud. Member price $38.00—Product code: SMODMA).

Another possible solution is to have the bulletin board at the other end of the line send a series of null characters after every line feed. Most bulletin boards have this capability. This will give the Apple time to scroll the screen and the lost characters will be unimportant. You will have to experiment a little bit to find the proper number of nulls that need to be sent.

USEFUL TIPS

Q. *I recently purchased a 3.5 UniDisk for my Apple IIe. Shortly after I bought it, a friend told me that there is a problem with the controller card, and if you accidentally write on a write-protected disk, some data may be lost. He also gave me a program written by the Washington Apple Pi group which allows you to check your controller card to see if it has the bug. I tried the program, and sure enough, my brand new card had the bug. I also tried writing on a write-protected disk, and produced weird results. After trying to save a file to a protected disk, all the blocks were used up with the protect on, and after it was removed, 1 block was added somewhere. In another test, my friend wiped out over 300 blocks, yet the directory looked as though everything was ok.*

A. The problem is that the 3.5 drive does not return the write protect status to ProDOS. The diskette is actually protected and is not written to despite the fact that ProDOS thinks it was. If you stopped here, turned your Apple off and rebooted you would find your original disk intact, less the last thing you tried to save when it was protected. The solution, if you have written to a protected disk, is to immediately remove that disk, insert an unprotected scratch disk, and save your file to that. Turn your Apple off, reboot ProDOS, load in the file you saved on the scratch disk, and save it to the now unprotected original disk.

The program you refer to is called STATUS CHECKER and is available from Washington Apple Pi and is also on Compuserve. Tom Vier, who wrote the program, reports that Apple is supposed to have a new version of the disk drive out soon that solves this problem. At this time, they have made no announcement about what they will do with existing drives.

Tom has another tip to pass along. The UniDisk connecter from the controller card looks similar to the familiar DB-25 connectors used for connection of RS-232 serial devices to the Apple. Users may be lulled into thinking that because it is okay to plug and unplug RS-232 devices while the power to the Apple is on, it is okay to plug and unplug the disk from this connecter while power is on. *This is not so. Do not* plug or unplug the UniDisk while the Apple power is on, you may damage the UniDisk, the Apple or both.

EVIL LEVELS OF VOLTAGE?

Q. *I own an Apple IIe that is now three and one-half years old. Over a year ago I purchased a fan/surge protector. Everything had been working well until about two weeks ago. The machine suddenly died. On investigation, I found the power-on light was not going on; I tested the power supply and found it dead. After a little backing and forthing with the technician at our dealer's, we determined that the power supply was working intermittently and I replaced it.*

While discussing all this with the technician, he suggested that the failure could be attributed to the fan/surge protector. He stated that during the time the fan takes to come up to speed on power-up, evil levels of voltage are passed on the power supply causing it sooner or later to fail. His explanation seems unlikely to me. What do you think?

A. HOGWASH! That fan has about as much effect on the line voltage as a mouse pushing an elephant.

This does bring to mind a fix suggested by Tom Vier. A lot of the time the thing that fails in the power supply is a $2 capacitor. Apple dealers will kindly replace the entire power supply for you (and at great expense too). If you are handy with a soldering iron, you might save at least $50 by replacing the capacitor yourself. Tom Vier posted the following fix on the Washington Apple Pi bulletin board system.

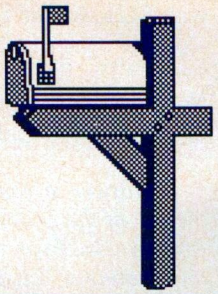
1. Pop the lid off your Apple and set it aside.
2. Remove your peripheral cards and unplug the power supply from the motherboard.
3. Turn the Apple up on its side with the power supply up.
4. Use a Phillips screwdriver to unfasten the four screws holding the power supply and remove the supply.
5. Pop the two rivets and remove the cover of the power supply.
6. Locate and remove capacitor C7, a 220 uF 10 V capacitor. (It might have a number different than C7.)
7. Replace C7 with a same value capacitor with at least twice the voltage rating (20 V). Use a soldering pencil, not a soldering gun! *No acid solder either!*
8. Plug in AC, turn on supply and test with a voltmeter.
9. Replace circuit board, cover, power supply, and connections.
10. Turn the Apple on. If ok, turn it back off, replace your peripheral cards and go.

I would recommend being very careful in step 8, as lethal voltages are present on the circuit board. *On second thought, it probably is better to skip step 8 entirely.* Just check carefully after soldering that you haven't left any bits of wire or solder lying around on the circuit board.

Correction:
There was an error in the November 1986 A.P.P.L.E. Doctor column concerning A.P.P.L.E. Co-op's Big Board. The correct product information is as follows:

Big Board (256K) expandable to 1 meg.
Product code: HB1MGE
Price: $159.00

Write A.P.P.L.E.



Reader' Forum

Using PKASO Superfont

The PKASO interface card offers some very unique and interesting features, but using them with one of the more popular word processors (Screenwriter II) is not the easiest or quickest thing to figure out. I have been trying to use the Superfont option in PKASO for two years without success. I tried PKASO and the makers of Screenwriter II—both were unable to give me assistance. This is about the normal state of affairs for any printer interface question. Maybe my two years of periodic hacking at the problem will save others grief. The Superfont option will especially interest other magazine writers like myself, because even in the original character set supplied by PKASO, there are printer items like © and ® for copyright and registered trademark. There is superscript and subscript capabilities also. The best part is, on top of all this, there is a great editor to make any Superfont set you want and load it as a file. Now—as for the how.

1. Copy the filename "SPECIAL CHARS.8HI" from the PKASOK disk to your *work* copy of Screenwriter II main disk (the one you boot in Drive 1, not the textfile disk used in Drive 2). The file is fully copyable, so just use FID that is on your Apple Master disk.
2. Boot your now modified Screenwriter II disk in Drive 1, and from the menu choose EXIT (option 3 on my menu).
3. Do a CATALOG, to determine the PKASO file is there. Then LOAD the filename "A" . List the file "A", as this is your SW II startup file. By editor or brute force modify "A" to read as follows:

```
10 PRINT "LOADING
   SUPERFONT
   CHARACTERS"
11 PRINT: FOR X=1 TO 200 :
   NEXT X
20 PRINT CHR$(4);"BRUN
   SPECIAL CHARS.8HI"
30 PRINT CHR$(4);"BRUN
   START
```

SAVE this back to disk as filename "A".

4. Now all you have to do to use the Superfont characters is turn them on—use the one you want—and turn them off. Simple, right?? Well, that is what fooled me for two years. It appears all you have to do is a control-I 1 S to turn on, and a control-I S to turn off.
5. First of all, a control-I knocks you right out of the SW II editor. Not to worry. Anything preceded by control-X will be sent literally. That only took me a month to find and figure out. The catch you may miss, as I did so long, is you must precede *each and every* character you want sent to the printer, including the full control item for things like Superfont !!
6. Therefore, the exact sequence is:

```
control-X
control-I
control-X
1
control-X
S
.... the Superfont key(s) you want
control-X
control-I
control-X
S
```

While this may seem like a lot, you soon get used to the special characters available from the original Superfont set from PKASO.

When you get around to the PKASO editor, and making your own SPECIAL CHARS or Superfont set, just be sure to copy them onto the SW II main disk as a filename, and be sure line 20 of the filename "A" is changed to call for your new filename. i.e. MY NEW filename was quite logically SPECIAL CHARS.BROWN. So line 20 does a BRUN SPECIALCHARS.BROWN, thus loading my new character set.

Happy word juggling,

Dave Brown W9CGI
Noblesville, IN 46060

Hardware and Appleworks Consultants

I need some help in two areas. First, I am looking to purchase a tractor-feed for an Okidata 92, 80-column, printer. The manufacturer has discontinued production and I have been unable to find a vendor who has one in stock. I would appreciate the name of a vendor, if possible.

Second, using AppleWorks 1.3, I have been unable to load files that I created with Screenwriter II, Sierra On Line. I have converted the files to ProDOS, but when AppleWorks recognizes them as "NON APPLEWORKS FILES", it prevents them from being loaded. Is there anyway to overcome this problem, or is my only recourse retranscription.

John P.M. Ehrling

In answer to your question regarding AppleWorks, you have only one hope and that is if Screenwriter has the ability to save its files as standard ASCII text files, you can then open it as such when creating a new file for the word processor. If SW does not have this capability, you're dead in the water. AppleWorks will read standard ProDOS text files.

Larry Neibauer
A.P.P.L.E. Product Development and Technical Support.

See Your Dealer

I am an avid reader of *Call - A.P.P.L.E.*, and have been since 1981. You see, I have all the issues since 1978. I really am only twelve years old., but my father is an old subscriber. My big problem is that I am an Apple II Standard user, with a revision 1 board. With the new articles on the ProDOS operating system, I have found I am being left behind.

I'm not exactly asking you to stop writing articles about ProDOS, because I know ProDOS is really something to talk about. I have used it on my friend's computer, and am truly impressed with Apple's capability to radically increase the Apple's functional capabilities.

What I would like to ask of you is

for information on how I could possibly turn my Apple II into at least a II+. I know I could've done this years ago, but I didn't really know what a II+ was at the time, you see, and my father didn't like the idea.

If it is still possible to get this upgrade, could you please send me information on acquiring the ROMs, PROMs, or EPROMs necessary.

Gary Steven Grossman

It has been a long time since Apple Inc. introduced the ROMs for their Apple // computer to upgrade it to an Apple //+. Fortunately they are still available, but they may have to be special ordered from Apple. Contact your local Apple dealer and explain your problem. They can order the ROMs for you.

Keith Nemitz
A.P.P.L.E. Co-op Technical Consultant

Diablo and AppleWorks

Is there anyway to use a Diablo 630 with AppleWorks? I have version 1.0, but will upgrade to 1.3 (is it necessary?) I have a IIe and IIc. I have Ramworks II with 512K for the IIe and Pinpoint with a printer enhancement kit. Nothing works. The Diablo is set to run with a Northstar advantage and has a standard 25 pin connector... Help??

In answer to your question regarding the use of the Diablo 630 printer with AppleWorks, I can only recommend you try creating a "Custom Printer" and enter the printer control codes for each of the functions you wish to use. The explanation is rather lengthy and would consume a great deal of paper, however, if you are not familiar with this procedure you can call the "Hot-line" and we can run through it with you over the phone.

Larry Neibauer

A Hidden Version?

I was browsing through some older copies of *Call -A.P.P.L.E.* and noticed in the November, 1985 issue a comparison chart by Jeffrey M. Jacques of SuperCalc3a and THE Spreadsheet.

I was astonished to see him writing about THE Spreadsheet Version 2.173. Where is this version? Have I missed notices of this in the magazine? Are you offering an upgrade and I didn't hear about it?

I could certainly use that 90K memory in my IIe. Please advise where this version is hiding.

In answer to your recent letter regarding version 2.173 of The Spreadsheet, the answer lies in the undocumented(?) "/V" command in the calculate subsystem. Once this command has been issued the actual version number of the program will appear in the upper left-hand corner of the screen. If you do not have the current version, it can be obtained by sending your original disk and $10.00 dollars to: Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601

Larry Neibauer

Events Calendar

Micro-Ideas will host **The Role of the Computer in Education VII** on February 18, 19, & 20, 1987 at the Arlington Park Hilton, Arlington Heights, IL. Wednesday will offer in-depth day long pre-sessions, while Thursday and Friday will provide many sessions covering a wide range of educational topics. For further information write:

The Role of the Computer in Education VII Micro-Ideas
2701 Central Road • Glenview, IL 60025 • Attn: Rick Nelson • (312) 998-5065

Computer Graphics New York '87 January 28-30, 1987

Computer Graphics New York '87 is the third annual exhibition and open forum devoted to computer graphics hardware, software, systems and services. Applications covered include: business and presentation graphics; film, video and TV; animation and advertising; electronic printing and publishing; and CAD/CAM, CADD and CAE. Highlights include a full slate of open forums and a special presentation on computer graphics in advertising. For more information contact:

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Please send in details of your upcoming conferences, trade shows, meetings, etc. which would have a national or international interest among Apple users. We need your copy at least 2 months in advance. Send your notice to:

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RENT APPLE II SOFTWARE—$5 monthly. No membership fee. Send large $.39 SASE for list. PS Software, 4229 Baker Ave. NW, Seattle WA 98107 .

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75 CENT APPLE PUBLIC DOMAIN LIBRARY—Our 170 disk library contains thousands of programs for the Apple II, II+, IIe and IIc. Our copy-shipping fee is 75 cents/disk postpaid. We can copy onto disk(s) you mail to us or provide blank disks—$1.55 each extra. We can copy single-sided or double-sided. Our 33 page public domain catalog is $2. No additional charges or membership fees. ASPEN SOFTWARE, 729 1/4 E. Portland St., Phoenix, AZ 85006, (602) 253-0651.

TESTWRITER 1.0—Uses your AppleWriter to create tests, answer keys from easily written testbanks. $35 postpaid ($40 foreign). P. Smukler,P.O. Box 214, Dobbs Ferry, NY 10522-0214.

FREE SOFTWARE—Extended demo/sampler of "A Christmas Adventure". Surprise-filled, wonderfully entertaining text and hi-res graphics adventure program. "The perfect gift to ring in the holiday season" can be customized to include personal references to the player as well as sender's own holiday greeting message. "Absolutely superb—R. Farmanfarmaian, Managing ed., Family Computing; "Delightfully humorous"—Computer Entertainer. Playable sampler contains almost half the actual program plus mini-customization utility. Limit, one copy per household. Please enclose $2.00 to help defray shipping/handling costs. (Cash, stamps—9 x $.22 or 5 x $.39—or money order O.K. No personal checks, please.) Address request to FREE DEMO, BITCARDS INC.,P.O. Box 1289, Champlain, NY 12919-1289.

WORD SEARCH PUZZLES—are a great teaching aide to build vocabulary, improve spelling or for your own enjoyment. Up to forty words can be used. The size of the puzzle can be either 20 by 20 or 20 by 40 characters. Each puzzle has a unique solution, if you print the same puzzle twice, each puzzle and solution is different. THE DGI NUMBER SEARCH program is also included. Only $30 postpaid for the Apple II+, IIe, IIc. To order or for sample puzzle contact Chuck Blish, P.O. Box 2131, Littleton, CO 80161, (303) 796-0341.

APPLE PASCAL USERS—Create input screens with the SCREENMAKER. Completely interactive program to create "bullet proof" data entry screens. Supports integers, longs, and reals, both signed and unsigned and strings. Full cursor controls and six terminate keys. Package includes MAKER, EXECUTOR, and ENHANCER for the Apple IIe, IIc and any version of Apple Pascal plus examples and documentation. Includes all source code. $25 to CNO Software,P.O. Box 533, Forest Grove, Oregon 97116-0414

WANTED—For elementary school and high school. Apple computers (II, IIe or IIc). Donations are tax deductible. Call John Henning (206) 941-6786., Kent.

INTERFACE CARDS FOR WHOLESALE PRICES—16K RAM card $37.80, Z-80 card $35.90, 128K RAM card $64.00, 8088 card $57.30, 80 column card $45.80, Driver card $36.50, Coloer Graphic card $61.50, Monochrome graphic card $69.00, Mouse $89.65, Telex card $157.15, and 60 more different kinds of cards for special prices. Hunter electronic Co., LTD.P.O. Box 53-130, Taipei Taiwan, Rep. of China.

INTERNATIONAL COMPATIBLES—Supporting II+, Franklin, & all compatible users, with a monthly newsletter, public domain library, on-line services and personal attention. Membership $20 a year. Info: SASE. Franklin-Users-Group-International, 65 East Wind, Tecumseh, MO 65760 Modem (417) 869-5294.

THE LOST ARC OF THE COVENANT—An all-new machine language hi-res adventure game for the Apple II+, IIe, IIc with one drive (3.3 DOS). This adventure has won a gold medal in a Long Island Computer Show, and includes graphics routines from Penguin Software's Graphics Magician. With over 150 hi-res images, you can explore tombs, jungles, subterranean complexes, deserts and other enchanted terrains. This two-diskette adventure has taken over three years to create and can be yours for $14.95, with no postage charge! Send check or M/O to MICROSCAN, 1384 Lyon Place/Dept C, Wantagh, NY 11793. Include $2 if you want hint sheets and a map of this 100 location adventure. Orders will be shipped IMMEDIATELY. Call (516) 826-5807 for more information.

MOUSETRACER—Use your Mac IIe, or IIc mouse and draw like the pros! Put cartoons, pictures, maps, etc. on the drawing board. Strap your mouse to the Mousetracer and with your favorite graphics program trace the picture of your choice. Works like a 1:1 drafting board pantograph. Send $34.95 + $3 UPS shipping (CA res add $2.10 sales tax) to: Brimark Innovations, 9821 Yolanda Ave. Northridge, CA 91324.

BEYOND PINBALL—The first Pinball Adventure Game—is not another computer simulation of pinball but stretches the concept as only a computer can. Contains not one but 16 games. Contains not one, but 48 screens to play on. Does not have two stationary button-controlled flippers, but instead, a joystick-controlled bumper and 360-degree-swinging bat movable all over the screens. Some of the types of obstacles you'll encounter: Black Holes, Forbidden Zones, Transport Tubes, Moving Objects and Switchable Objects. Includes extensive manual and game maps. Apple II+, IIe, IIc. Temporary low price through December = $17.00. Send check or M.O. or Visa-Mastercard to Prime-Ware Creations, P.O. Box 1058, Philomath, OR 97370. Need more info? Send SASE. (503) 929-6221.

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APPLEWORKS 1.3 —Unused $130 (206) 363-8583 Vincent 12349 Roosevelt NE Seattle, WA 98125

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APPLEWRITER IIE USERS—"AppleWriter Enhancer" is a collection of POWERFUL WPL programs that tremendously simplify AppleWriter usage. Developed for the daily needs of the small office. DOS commands from SCROLLABLE CATALOG; load files from SCROLLABLE CATALOG; on-line CALCULATOR for simple calculations; determine FREE DISK SPACE; AUTOPRINTING A ROUTINE to avoid constant changing of print destination; ALPHABETIZING ROUTINE to simplify proof reading; CHRONOLOGICAL filing system; plus others. AppleWriter with WPL is one of the most powerful word processors around. With AppleWriter Enhancer, you can really put WPL to work. Specify DOS 3.3 or ProDOS. Send $34.95 to: MIC, Route 1, Box 235-A, Kent, CT 06757.

KERMIT—Why spend hundreds for communications software when the best is FREE? Just send me $8 for the disk, documentation, shipping and handling and I'll send you Columbia University's APPLE-II, DOS 3.3 KERMIT, FREE! Jim Fox, BOX 14756, Pittsburgh, PA, 15234.

HI-RES COMPUTER GOLF 3—Eight Pro-Courses Series. Now in its fifth year, this version contains the same quality features of prior versions and includes a beginners course and EIGHT professional tour golf courses. Contains true-to-scale fairways and greens (longer holes may require four screens), green contours, sand traps, roughs, trees, water traps and variable wind conditions. Eight clubs in your golf bag. You physically swing the club or use the auto-swing feature. Bad swings may cause tops, undercuts, hooks, slices, etc. Up to a foursome can play. The package contains two diskettes, extensive manual and command card. Apple II+, IIe, IIc. Total price = $21.00. Send check, M.O. or Visa/Mastercard number to Prime-Ware Creations, Box 1058, Philomath, OR 97370 or phone (503) 929-6221.

APPLE-80—Supporting Apple CP/M users CP/M with a monthly newsletter, public domain library, hot-line. U.S. membership $20 a year, $30 with expanded disk newsletter, $42 with our Disk of the Month. Add $15 outside North-America. Sample Newsletter $2, PDS catalog $5. A.S. C. I.I., 65C East Wing, Tecumseh, MO. 65760. (417) 679-3526.

XPCLOCK: GREAT APPLE CLOCK BOARD!!—Full power of MM58167a Clock chip including special standby interrupt which is active with power off (can be used to turn on computer). 2K RAM (or EPROM) on board for user programs. ProDOS compatible. All clock registers Basic PEEK'able. Clock has battery back-up. All combinations of interrupt rates easily accomplished from 2 ms. to 1 year. Example routine listings. $85 check or COD extra. Texas add 6%. Allow 3 weeks. Amnor Corp.; 2518 Jester Lane; Stafford, TX 77477.

SCIENCE EDUCATION SOFTWARE—Particles of Matter: Solids. Software and print-based Learning Module for Junior High Science Curriculum. Module uses a Learning Cycle approach to integrate discovery-based laboratory work with Interactive Tutorials. Teacher designed and tested. Apple II compatible. $35. Write for brochure. FULCRUM SOFTWARE, MS 20 8945 SW 177 Terrace, Miami, FL 33157.

APPLE IIC MODEM PROGRAM—$ 19.95. Full feature telecommunications sytem including: XMODEM file transfer, 60,000 character capture buffer, XON/XOFF, Hayes compatible commands, Text Editor, phone directory, 300-1200-2400 baud, copyable, SASE for information. Money-back guarentee. Cook Computer Products, 2215 Goldsmith, HOUSTON, TX 77030.

INTELLIGENT DISASSEMBLER—Learn assembly language by studying programs written by the masters. DISASM converts machine code into clear readable assembler source code. A versatile utility program for experts and novices alike. Creates symbolic text files compatible with S-C, LISA Toolkit & other assemblers. Determine Page Zero useage instantly. Many features. Don Lancaster's ASSEMBLY COOKBOOK says DISASM is "absolutely essential". For Apple II, II+, IIe and Apple IIc. STD 3.3 DOS (not copy-rprotected). Only 430.00 (or $50.00 w/commented source) prepaid. Write for catalog! RAK-WARE ,41 Ralph Road, West Orange, NJ 07052 (201)325-1885.

CRAKNIQUES—A book that will teach you how to remove copy protection. Crakniques teaches you the methods, the techniques, for removing copy protection. Crakniques also comes with three practice disks and a track examiner. Send check/money order to: M. Haines, 215 N. Terrace, Wichita KS 67208. Make payable to: M. Haines.

CAPTAIN: COGNITIVE TRAINING SYSTEM: 21 programs for training attention, memory, visual/motor, and reasoning skills. CAPTAIN was developed in cooperation with Cumberland, a hospital for children and adolescents. Apple II:, IIe or IBM PC/XT/AT required. Demo disk available ($10 ea), specify Apple or IBM version. Network Services, 1915 Huguenot Road, Richmond, VA 23235 (804) 379-2253.

MIDI HARDWARE/SOFTWARE—Use your Apple to control MIDI equipped music keyboards (like Casio's CZ-101). MIDI-out interface for the Apple IIc is Passport file compatible ($49.00). Song disks with 100's to choose from Gershwin to Madonna ($19.00). Midi accessories too! Send SASE for catalog. RAK-WARE 41 Ralph Road, West Orange , NJ 07052 (201) 325-1885..

IIePERIPHERALS—288K "Flashcard" RAMCARD with software, $100. EPS detached keyboard with function keys, $150. Koala pad with software, $35. Max Daniel, 410 Front, Orange, TX 77630. (409) 883-7750.

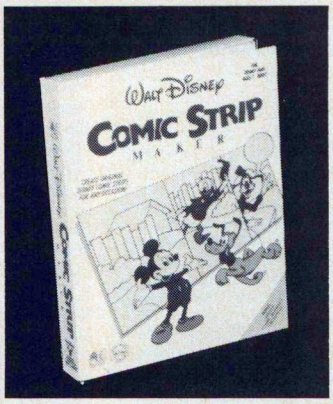
PERSONALIZED DISKETTE LABELS—make perfect gifts for computer enthusiast. Labels are 1" by 4", up to four lines of text will be professionally typeset and printed. $12.50 per 100 labels. Decision Graphics, Inc., P.O. Box 2776, Littleton, CO 80161, (303) 796-0341..

/UNIRAM/PRODOS RAMDISK—Ramdisk for ramboards like Legend, Titan/Saturn, Knowdrive, Prometheus and compatibles. Combine up to 5 boards, up to 3 Meg. addressed as one large volumen. Does not disable /RAM or other auxiliary slot ramdisks on the IIe. Mix brands in slot 0-7. Copy.CMDk, utilities and a DOS 3.3 bonus. $20.00 check ppd. Steven Humpage 2427 NE 24th Ave., Portland, OR 97212.

THE MARKETPLACE

The following items are selected by our editorial staff from the large number of product announcements and news releases sent to us daily. They are presented solely to keep you informed about the current market for Apple related hardware and software. As we have not tested many of these products, appearance here does not necessarily represent endorsement or recommendation by **A.P.P.L.E. Co-op.** Further information about items appearing in **The Marketplace** can be obtained through the Reader Service Card. If you contact any manufacturer directly, please mention that you learned about them in **Call -A.P.P.L.E.**

WALT DISNEY SOFTWARE



Bantam Books Inc., announces WALT DISNEY COMIC STRIP MAKER and WALT DISNEY CARD & PARTY SHOP, The first ever Walt Disney productivity software. These two new software programs will enable children of all ages to create their own stationary, party items, and comic strips using their favorite Disney characters.

WALT DISNEY COMIC STRIP MAKER allows you to design and write your own comic strips. The designer can choose from among 180 hi-res color graphics of Disney characters, as well as assorted objects and backgrounds, which can be transposed, cropped, mixed and matched for the comic. The user can build a comic strip by filling in balloons with either original or pre-programmed phrases, branching a story by selecting frames and using original or pre-programmed phrases, or creating a strip from scratch. Each comic strip can be personalized and printed out in color or black and white.

Festive occasions can become even more special with the WALT DISNEY CARD & PARTYSHOP. By using the more than forty-five pre-programmed designs or choosing among the array of Disney characters and objects to create an original design, children (or parents) can make personalized stationery and party goods like greeting cards, invitations, place cards, wrapping and much more. Users can choose from over one hundred high resolution, color graphics that include characters in several poses from Mickey and Minnie to Thumper and Winnie the Pooh; assorted decorations such as birthday cakes, Christmas trees and hearts; and a variety of type-faces; and then print out the finished product in color or black and white. Also included are three pre-programmed party sets that WILL print out everything for an Alice in Wonderland or Winnie the Pooh or Mickey and friends party theme.

Both programs contain an easy-to-use art tool box for sizing, transposing, and cropping characters, as well as a built- in word processor. Price: $39.95 *Bantam Books , 666 Fifth Avenue, New York, NY 10103 (212) 765-6500*

CIRCLE **30** ON READER SERVICE CARD

LOGO WITH MUSIC

Terappin, Inc., announces Terrapin Music Logo, which replaces the graphics portion of the Logo language with a set of music primitives. The result is a unique toolkit that can be used to compose music in six voices simultaneously, in a procedural environment. Logo, an extensible language, is particularly useful for working with music, encouraging users to invent their own dynamic procedures that can be used in many different ways to transform existing motives or to manipulate pitch in various relations to rhythm.

As a laboratory for experimentation in musical perception, Terrapin Music Logo is intended for a wide spectrum of users: those who do not play an instrument and have no formal musical background, novice musicians, performers and composers, Logo users interested in exploring a new Logo microworld, music teachers at all levels who want an exciting new medium for introducing and exploring music concepts. Terrapin Music Logo runs on the Apple II family of computers in 64K. An ALF 9-voice synthesizer board with amplifier and speakers (or home stereo) is required. A set of game paddles is needed to control the tempo at which the music is played. Included in the package is a comprehensive 190-page Sourcebook, Terrapin Music Logo Language disk, back-up disk, and a projects disk with a number of music tools and procedures. Price: $99.95 *Terrapin, Inc., 222 Third Street, Cambridge, MA 02142. (617)492-8816.*

CIRCLE **31** ON READER SERVICE CARD

HAPPY HOLIDAYS

Greeting Cards

Activision announces "Greeting Card Maker", do-it yourself card generator for the Apple II series. With this software program, cards, invitations and announcements for any occasion can be designed and scripted quickly, personalized, and printed in vivid color or black and white. "Greeting Card Maker" features a number of options that make it highly flexible, including: 6 different size cards including three-dimensional pop-up cards; Scores of pictures, designs, clip-art objects, panoramic scenes; Two dozen background patterns and borders; 8 type styles, each in upper-and lower-case; A wide variety of different verses for virtually any occasion. Some other features include: ENVELOPE MAKER, which enables users to construct 3 different sizes of matching envelopes out of stationery and automatically generate pre-addressed envelopes. ADDRESS BOOK, which can maintain multiple lists, each up to 128 names and addresses, so distinct lists of friends, relatives and associates can be kept for different occasions (for example, one could keep separate lists for Christmas, Valentine's Day, birthdays, dinner parties, Super Bowl get-togethers, etc). CARD RACK, which allows the user to store and retrieve previously-designed cards by occasion, simulating a real card store rack.

Packed in with the software diskette come 20 sheets of ivory parchment stationery, instructions for ordering additional stationary and an easy-to-follow, step-by-step manual everything the user needs to get started. The Apple version of "Greeting Card Maker" permits users to access clip art pictures from the popular "Print Shop" software program, integrating them into cards for virtually limitless variety. *Price: $34.95. Activision Inc., P.O. Box 7286 , Mountain View, CA 94039 (415)960-0410..*

CIRCLE **32** ON READER SERVICE CARD

Christmas Ornaments

Activision Creativity Software announces the release of its new computer software product, PAPER MODELS: THE CHRISTMAS KIT. The kit contains the software and all the tools needed to create three-dimensional Christmas ornaments and decorations. This is a fun way to make holiday decorations.

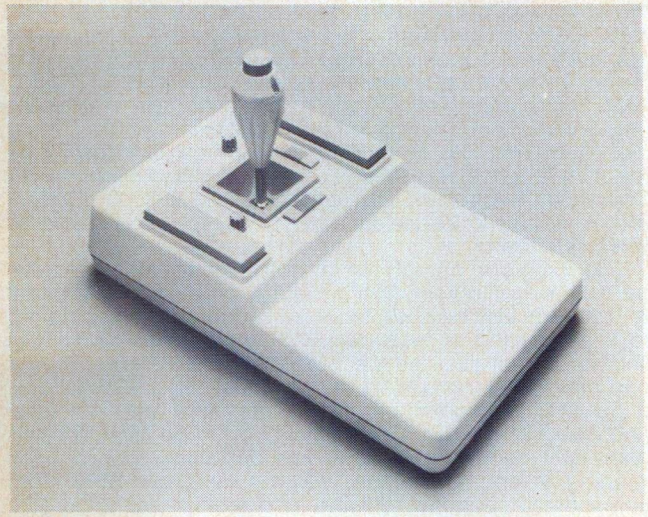
With The Christmas Kit, users can select patterns from an entire spectrum of different holiday items such as cubed and triangular gift boxes, toy trains, sleighs and complete Dickens-style Christmas villages. These items can be decorated with customized graphics using a special built-in paint program or a ready-made clip-art library filled with seasonal Images.

Completed decorations are then printed ready to be assembled and displayed on a Christmas tree or given away as gifts.

The Christmas Kit contains everything you need to get started; a glue-stick and ruler, red and green marking pens and 10 sheets of card stock for mounting the decorations. *Price:$29.95 Activision Inc., P.O. Box 7286 , Mountain View, CA 94039 (415)965-1216.*

CIRCLE **33** ON READER SERVICE CARD

AN INTELLIGENT JOYSTICK



CH Products introduces an advanced intelligent joystick for the Apple, Mach IV. The MACH IV provides a special precision motion ring in the first 20% of the proportional joystick's motion. The balance of the joystick stroke provides a highspeed ring for rapid controllable motion. The custom integrated control chip in the MACH IV senses when the user is slowing down. The joystick then brakes the motion preventing overshoot. At a flick of the switch the MACH IV becomes a multibutton game joystick ready to operate with any game or game port based software. The precision backlash free construction and high quality potentiometers in the MACH IV provide the ultimate in game joystick performance. Trim tabs and variable action controls make the unit adaptable to any purpose. *Price:$89.95. CH Products , 1225 Stone Drive , San Marcos, CA 92069 (619)744-8546.*

CIRCLE **34** ON READER SERVICE CARD

FAMILY ENTERTAINMENT

Robot Rascals

Electronic Arts announces the release of the Apple II version of Robot Rascals, which is half card game and half computer game. In Robot Rascals, 2 to 4 players embark on a zany scavenger hunt using any one of ten on-screen robots, and two colorful decks of playing cards. Luck cards can force players to swap cards or give players the opportunity to pass off unwanted cards. Item cards may contain items that can strengthen a robot's functions or weaken them. During the game, the players scan for items and send their robots into the computer "wilderness" to retrieve those items that are represented by the cards in their hand. The robots travel into forests, mountains and swamps to find high-tech treasures like the Digital Donut, Transistor Taco or Gamma Glasses. If the robots need to conserve energy, the players can beam them from place to place using one of the five teleport terminals. The players are constantly swapping cards, passing unwanted cards to other players, and trying to avoid getting stuck with the "Killer" card that can cause them to lose the game. Additionally, a global event that takes place at the beginning of each round, such as no scanning, free teleports or item cards reversed, can change the entire direction of the game..

Robot Rascals blend the strategy and randomness of a card game with the high-tech world that only a computer can create. And, because the game has a built-in handicapping option, family members of all ages can compete at an equal level. It's fast, frantic fun with great animation, colorful graphics, lively music and realistic sound effects. Price: $44.95 *Electronic Arts , 1820 Gateway Drive , San Mateo, CA 94404 (415)571-7991 ex.331*

CIRCLE **35** ON READER SERVICE CARD

DIGITAL VISION

ALL NEW

COMPUTEREYES/2™

VIDEO DIGITIZING SYSTEM FOR APPLE II SERIES COMPUTERS

The world's highest-quality, lowest-priced video digitizer has just gotten even better! The new card-based COMPUTEREYES/2™ for Apple II, II+, IIe and compatibles connects to any standard video source to capture real-world images on your Apple's graphics display. Hundreds of applications!

COMPUTEREYES/2™ features include:

- Fast scanning-single 6 second scan for all capture modes
- Automatic and manual control over both brightness and contrast
- Keyboard-controlled video switching to allow previewing the video source on the Apple monitor.
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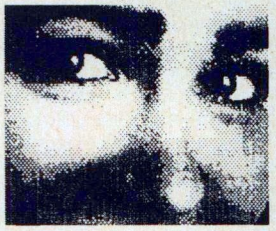
- Optional COMPUTEREYES/2™ Enhancement Software package available to convert COMPUTEREYES images to Printshop, Printmaster, Newsroom, and other formats; perform image negate, flip, etc
- Also available as complete system including quality video camera



STILL ONLY $129.95

Versions available for:

- Apple II, II+, IIe and IIc
- Commodore 64/128
- Atari 800/800XL/130XE
- IBM PC and compatibles ($249.95—includes additional features)
- Atari ST ($249.95-full color digitizer)

See your dealer or order direct. Mass. residents add 5% sales tax. Mastercard, Visa accepted. To order, or for more information, write or call:

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CIRCLE **8** ON READER SERVICE CARD

DISKETTES

Highest Quality • LifetimeWarranty

Size	Quantities	SS/DD	2-NOTCH DS/DD
3.5"	Box of 10	$14.00	$16.00
3.5"	Case of 50	$60.00	$70.00
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VF	Pak of 25	$13.00	15.00
Assoc.	Case of 100	$46.00	$54.00
Brand	Carton of 500	$205.00	

(Includes hub rings, labels; thick sturdy diskettes, fully certified error free.)

VF PC

VF PC, IBM compatible, unassembled, complete $725.00
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VF PC, IBM compatible, minimum complete system, unassembled $585.00
VF PC, APPLE & IBM compatible, unassembled $1080.00
VF XT, IBM compatible, same as VF PC with 20 MB internal hard disk & controller, unassembled $1150.00

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VF ASSOCIATES

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CIRCLE **22** ON READER SERVICE CARD

Beyond Pinball

Prime-Ware Creations announces BEYOND PINBALL, a computer simulation of the physical game of pinball. This game stretches the potential of pinball far beyond what has been previously available. This game contains pinball "rooms" in which the ball goes on its "adventures" instead of just one pinball screen. There are four separate game layouts with 7 to 16-room adventures. The total number of pinball rooms comes to 48! Each adventure can be played using two different scoring methods and two varieties of user participation. There are also four skill levels.

Each of the 48 pinball rooms requires a different strategy; some are easy, some are difficult. You guide the ball through the rooms, avoiding objects, finally getting to the room containing the target. BEYOND PINBALL has no stationary flippers; instead you have a choice of a bat or bumper under your control which you move all over the rooms. Other features: moving pins, black holes, forbidden zones, objects that turn on and off, objects that are switches that turn other objects on and off, transport tubes, and more. The package contains one disk, extensive manual and game maps. Apple II series, 48K or more. Requires joystick, paddles or pad. Price: $24.95 Special price thru December $17.00 *Prime-Wave Creations, P.O. Box 1058, Philomath, OR 97370*

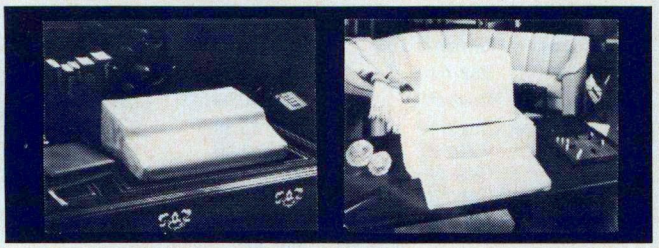
CIRCLE **36** ON READER SERVICE CARD

Tournament Chess

Firebird licensees, Inc. announces Colossus Chess IV, an outstanding computer chess program for the Apple II Series of computers. This program has several outstanding features, most notably its in-depth understanding of such esoteric tournament rules as the difficult King, Bishop and Knight versus Kingmates. Under promotions, the fifty move rule and all draws by repetition are also understood and considered by this advanced microcomputer chess game.

A comprehensive instruction manual is supplied with the program, and extensive libraries of classic opening moves and game histories are also included on the floppy disk. It permits toggling between traditional flat two-dimensional or exciting three-dimensional perspective video displays at any time during game play. Price $39.95 . *FIREBIRD , PO BOX 49 , Ramsey, NJ 07446.* CIRCLE **37** ON READER SERVICE CARD

DESIGNER COVERS



DESIGNER PRODUCTS, INC. recently introduced its first product line, designer covers for protecting personal computers, video cassette recorders and typewriters. Available in 12 colors, the covers are made of plain and patterned Ultrasuede, water repellent denim, and VersaTech, a new synthetic fabric only recently developed by Klopman Fabrics,. The covers not only allow your equipment to better fit into a decorating scheme, they serve a practical purpose by protecting the equipment from dust, liquid or other foreign matter that could disable the equipment. Additionally, each of the fabrics breathe, allowing condensation to evaporate from heated parts. All of the fabrics are machine washable. Suggested retail prices range from $9.99 to about $100.00. The covers can be special ordered with monogramming of organization logos or special designs. *Designer Products, Inc., 6585 South Yale, Suite 1050, Tulsa, Oklahoma 74136 (800)223-2687 , (800)223-COVR.*

CIRCLE **38** ON READER SERVICE CARD

CUSTOMIZE YOUR SOFTWARE

Effective immediately, CopperSoft Solutions has changed the brand name of their software product, to The CopperSoft Automatic Programming Environment, or CAPE for short. The new name is in response to feedback from current owners and the general public, and it is more descriptive of the software itself. CAPE is a two-part software development system for the Apple II line of computers. It runs on the Apple IIGS as well as the IIe, IIe enhanced, and IIc, all with a minimum of 128K of RAM. It runs under ProDOS and takes advantage of extended memory, clock cards, Pinpoint, hard disk drives, and 3 1/2 inch disk drives, also runs very fast on the Apple IIGS in fast mode. The $49.99 price includes a one-year subscription to the CopperSoft Electronic Customer Support Bulletin Board System. Price increases to $99 on January 1, 1987, when an enhanced version is released.

The program consists of a data-management program generator that automatically creates programs in Applesoft BASIC which can be easily modified by the user. The programs take advantage of extended BASIC ampersand commands (included) that provide the programs with increased speed and advanced features like windows, special disk file access, a powerful programmable INPUT statement, and time clock and calendar support. CAPE is designed to be used to quicky and easily create custom software applications such as bookkeeping, inventory, mail lists, questionaires, and other statistical software, personal software, or anything else that requires data to be input through the keyboard, stored on a disk, and retrieved for analysis or editing. The manual includes instructions on how to modify the programs, and further assistance is given through the bulletin board system. *CopperSoft Solutions ,1512 Atlantic, P.O. Box 404 ,Hancock, MI 49*

CIRCLE **39** ON READER SERVICE CARD

DISKETTE LABELS

Decision Graphics announces personalized diskette labels (one by four inches) with up to 4 lines of text professionally typeset and printed. Now with a personalized label on your diskette, if it is misplaced, it may be returned before you notice it is missing. As a gift they make very useful additions for the computer enthusiast. *Price: $12.50 per hundred. Decision Graphics, Inc., PO Box 2776, Littleton, CO 80161 (303)796-0341.*

CIRCLE **40** ON READER SERVICE CARD

SPECIALTY PAPERS

The Groverton Division announces a complete line of high performance specialty papers for a variety of computer printers. The Pro-Tech line offers a different paper for each type of printer, including those used in word processing, graphics, and data processing applications. The Pro-Tech line includes six different papers, each optimized for a specific use: ink-jet, thermal transfer, pen plotter, laser bond, 25% cotton, and printer bond paper. Unlike most specialty imaging papers, all accept printing on both sides of the sheet. Groverton is in the process of developing agreements with printer manufacturers to include the appropriate Pro-Tech paper with each printer sold. The Pro-Tech line is available in a variety of formats, cut sheets, continuous fanfold sheets, and shipping roll for converters. The line is sold by distributors across the U.S. *Newsome & Company, Inc., 225 Franklin Street, Boston, MA 02110 (617)426-4300, (800)255-0372.*

CIRCLE **49** ON READER SERVICE CARD

LABEL BASE

Heapsort announces LABEL BASE, a new program to keep track of your important people, places, and valuable information. Some of its features are: Program specifications: Store 559 labels per disk label area of 5 lines by 36 characters, Print up to 99 copies, Editing capabilities, User definable data fields, Searching and sorting by all data fields, Step forward and backward through labels, Variable printing formats, Printing up to 6 labels across. Labels can be printed on:

Disk Labels, Mailing labels, Bin labels, Tape Reel Labels, Envelopes, Post Cards, File Cards, Index Cards, Rotary File Cards, Regular Paper. Requires an Apple IIe or IIc computer with one 5.25 inch disk drive in slot 6. Price: #30.00. *HEAPSORT, 5484 East Holly Road , Holly, Michigan 48442.*

CIRCLE **50** ON READER SERVICE CARD

IIGS SECTION

THE BOSE ROOMMATE SPEAKER

Plug a pair of Bose RoomMate Loudspeakers into the new Apple IIGS computer and you have entered the next dimension of digital sound. Early in the development of Apples's New computer, with its high quality sound digitizing and synthesis capabilities, the company teamed up with Bose Corporation of Framingham, MA , the international audio products manufacturer. In all product demonstrations during its nationwide debut, the IIGS performed with Bose's " Special Edition " RoomMates, made to match the new computer.

The room-fillling, lifelike sound of the compact RoomMate speakers makes them the ideal complement to the new computer's 15 voice synthesizer. Originally introduced to turn pocket stereos and portable compact disk players into complete music systems.

Bose RoomMate features include:

- two full-range drivers
- dual channel power amplifier
- an active equalization network
- distortion limiting circuitry, all compactly fit in two 6 x 9 x 6 inch enclosures.

The RoomMate features many of the technological advances used in Bose Corporation's top-of-the-line 901 loudspeakers, considered by many experts to be the finest ever built. The RoomMate's ease of use, small size and versatility of applications has created a new category for sound equipment. An increasingly popular addition to the Apple Macintosh, the RoomMate can transform nearly any product with a headphone jack into a powerful audio system. *Bose* " Special Edition " RoomMate speakers are available through computer and audio specialty stores and fine department stores nationwide. Price: $229.00 per pair. *Bose Corporation, The Mountain, Framingham, MA 01701 (617) 879-7330.*

CIRCLE **41** ON READER SERVICE CARD

CONSTRUCT MUSIC IN STEREO

Electronic Arts announces the release of Music Construction Set for the Apple IIGS computer. Music Construction Set for the IIGS features all-new digitized instruments, so it produces music at a quality level, not obtainable with other computers. The piano sounds like a real piano, and fourteen more instruments from saxophone to a guitar to snare drum sound incredibly real. Music Construction Set supports the SuperSonic stereo card from MDIdeas, Inc. which allows users to compose and playback stereo music. Music Construction Set for the Apple IIGS supports high-resolution screen graphics, so the music looks like real sheet music on-screen and prints in sheet music format. These features, plus the original features that make Music Construction Set so useful and fun (full song transpositions; full cut and paste editing of measures; 1/32 to whole notes and rests; octave raisers; sharps, flats & naturals; tempo and volume controls with stereo capability) are brought together for maximum power on the new computer. *Price: $49.95 Electronic Arts , 1820 Gateway Drive, San Mateo, CA 94404 EA #79,(415)571-7991 ext.331.*

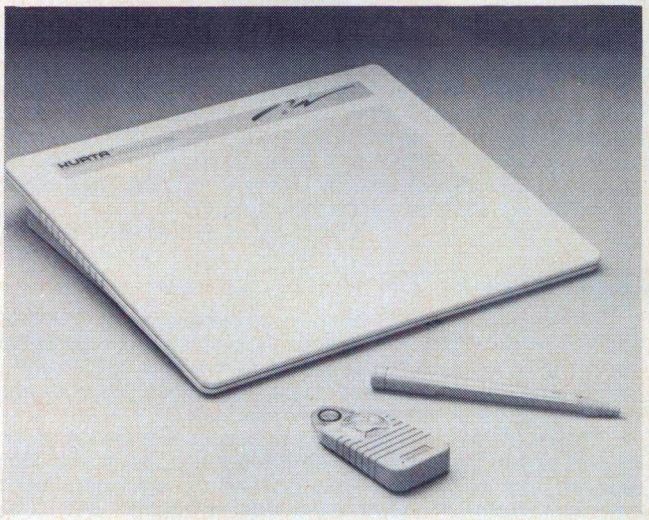
CIRCLE **42** ON READER SERVICE CARD

MANAGING YOUR MONEY

MECA, publisher of the personal financial software package, MANAGING YOUR MONEY, authored by Andrew Tobias, has developed a version of its best-selling program for Apple's new IIGS computer. MECA's 3.5" disk product for the Apple IIGS incorporates new features designed for the professional and small businessperson as well as for the home. They include accounts payable and receivable with aging, 5-year budgeting and tax forecasting, loan/mortgage refinancing, buy vs. lease comparisons, planning for a child's education, rental property analysis, retirement planning and much more. These new features will also be available in the soon to be released MANAGING YOUR MONEY Version 2.0 for other Apple II machines. Price: $199.95 (Also available for the Apple IIe and IIc 128K) *MECA , 285 Riverside Avenue, Westport, CT 06880 (203) 222-1000.*

CIRCLE **43** ON READER SERVICE CARD

CORDLESS GRAPHIC INPUT



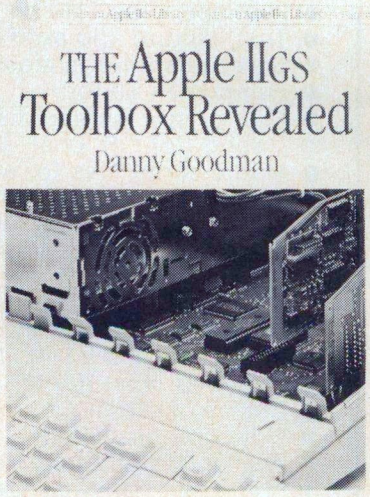
Kurta Introduces Graphic Input System For Apple IIGS.

Kurta Corporation announces the Kurta GIS, a new cordless graphic input system for the Apple IIGS computer. The Kurta GIS includes either a cordless pen or a cordless puck and a Tablet mode, and can be used as either a mouse or a graphics tablet. Users can switch between mouse and tablet mode while working on an application. Scaling lets users choose a fraction of a tablets surface. The smaller the area, the less hand movement is required. A single cable plugs directly into the Apple IIGS desktop port and daisy chains to the keyboard as well as the Apple mouse. Up to four Kurta GIS' can be connected to a single Apple IIGS, allowing four people to work on a single application. *Price: $495. . Kurta Corporation, 4610 S. 35th Street , Phoenix, AZ 85040 (602)276-5533.*

CIRCLE **44** ON READER SERVICE CARD

GUIDES TO THE GS

Bantam Books announces two new reference guides for the Apple IIGS computer. *The Apple IIGS* book by Jeanne DuPrau and Molly Tyson, and *The Apple IIGS Toolbox Revealed* by Danny Goodman.



Written by Apple Insiders, The Apple IIGS book covers all aspects of the Apple IIGS computer, from conception and development to its unique features and capabilities. Beginning with a detailed user's reference guide, the book explains the innovative features of the IIGS, basic computer concepts and operational procedures, the IIGS's 16-bit environment and the new sophisticated software program. The book provides a detailed description of the mouse users interface, the Finder, and the improved screen resolution and sound definition. It covers the three different operating systems which allow users to utilize the Apple IIGS to its full capacity. Interviews with members of the development team and Steve Wozniak that reveal intimate details of the com-

puter's development and design are also included. The Apple IIGS ToolBox Revealed defines the nearly 600 assembly language subroutines available to the Apple IIGS user. It explains how to utilize the onscreen windows, colorful animation, and detailed graphics with the help of the toolbox. For programming newcomers, a description of programming languages and suggestions on how to choose the best one for the job at hand is included. For more experienced users, instructions are given on how to incorporate the toolbox routines into C Pascal and assembly language programs, how to design event-driven programs around Apple's User Interface Guidelines and the comparisons between the Macintosh and the Apple IIGS toolbox. The user is provided with instructions on how to adapt Macintosh programs to the IIGS's 4,096. colors. *The Apple IIGS book by Jeanne DuPrau and Molly Tyson, Price: $18.95,. The Apple IIGS Toolbox revealed by Danny Goodman, Price: $21.95 Bantam Books , 666 fifth avenue, New York, NY*

CIRCLE **45** ON READER SERVICE CARD

GRAPHICWRITER

DataPak Software, Inc. announces the release of GRAPHICWRITER for the Apple IIGS. Rather than simply porting already existing software from the Apple IIe to the new IIGS, DataPak has an innovative approach and created their program from scratch utilizing their Macintosh expertise.

GRAPHICWRITER is a full word processor that allows graphics and text to be combined on the same page, in the same program. It is perfect for every day letters, legal documents, reports, illustrated manuals, flyers, ads, newsletters and "Desk Top Publishing". Left, right, center, full justification, and multiple line spacing are all standard in GraphicWriter. Tab and margin settings are paragraph oriented, so you can set each one individually or use the same setting for the entire document.

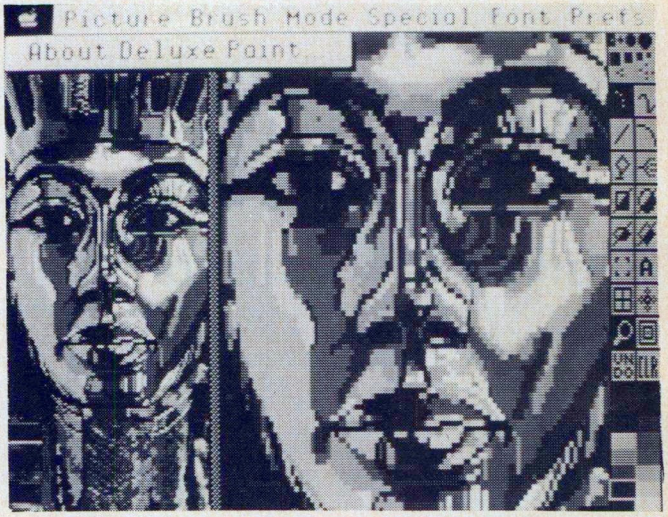
Basic fonts and styles are also included in the word processor, plus you have the option of printing your documents in any of the forty eight colors that are provided via the "paint pallet". Newsletters, flyers, etc. are laid out by selecting "Regions". Once the regions are created they can be rearranged, if necessary, through "Show Full Page".

The object oriented graphic tools, located along the bottom of the screen, can be incorporated into any document. In addition to the graphic tools, GraphicWriter has a, bit oriented, feature called "Canvas Mode" which will allow the user to draw free hand and import graphics from other programs. Graphics can be saved for future use by placing them into GraphicWriter Scraps". The program is compatible with both the Imagewriter II and LaserWriter printers. Color separation is a snap with GraphicWriter, multi-tone screens can be printed for each color to produce camera ready copy. *Price: $149.95. DataPak Software, Inc. ,14011 Ventura Blvd, Suite 507, Sherman Oaks, CA 91423 (818)905-6419.* CIRCLE **46** ON READER SERVICE CARD

PRINT SHARING

Corvus Systems announces a print spooler card to provide transparent print sharing for Apple II computers on a Corvus Omn I network. Transparent print sharing (spooling), is the ability to print to a shared printer from within an application program without having to issue any additional commands. For applications with printing capabilities, this means using the built-in print functions of the program to print to a shared printer on the network. The Print Spooler Card also allows transparent printing of BASIC programming files and non-ASCII files in addition to standard ASCII text. *Price:$65.00. Corvus Systems, Inc. , 2100 Corvus Drive , San Jose, CA 95124 (408)559-7000 Telex 278976.* CIRCLE **47** ON READER SERVICE CARD

NEW PAINT FEATURES



Electronic Arts DeluxePaint II (Available in February 1987) which has all the powerful features of DeluxePaint which were designed to satisfy professional graphic artists, business users, educators and creative hobbyists at home. Features include custom-mixed color palettes; more drawing tools than Mac paint, color cycling and symmetry; magnification with zoom; picture manipulation effects like re-size, flip, stretch and bend; and texture effects like blend and shade. The new features of the IIGS version of DeluxePaint II include Pattern Fill, which allows users to fill bounded spaces with any available pattern or gradient blend of colors as well as any created pattern; Stencil, which allows painting "behind" and "in front of" other objects and art; Anti-Aliasing, which lets artists create soft, smooth, color transitions and minimizes "Jagged" edges; and Perspective,which gives users the ability to turn 2D into 3D with one click of the mouse button and allows control of the rotation of all three X,Y, and Z axes to create realistic, perspective views. Additional features of the new version include four different color cycles; the ability to freeze pictures into the background and paint on top of it without damaging it; a variable page size feature which lets users paint on a "canvas" twice the size of the monitor screen; and a "corral" tool that alows the user to pick up any odd-shaped image. Price: $99.95 .Electronic Arts,1820 Gateway Drive, San Mateo, CA 94404 (212)765-6500 .

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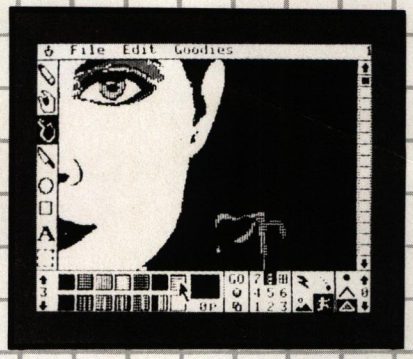

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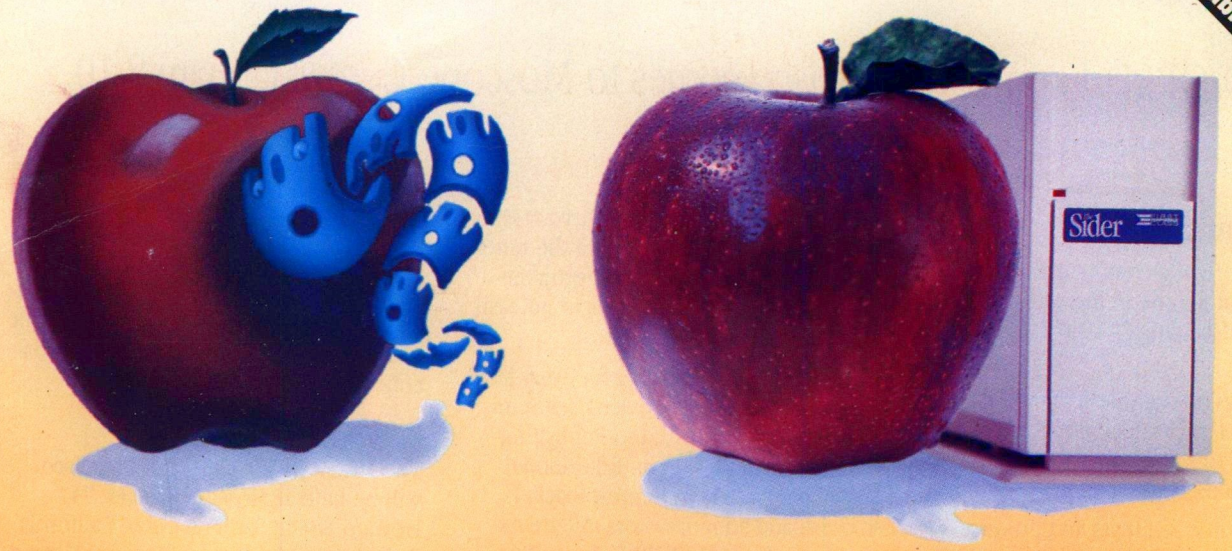

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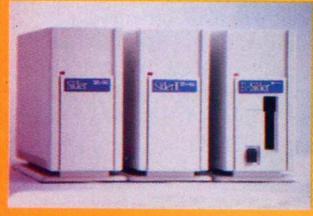

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